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<u>Alison Yates</u>	<u>July 1995</u>
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# **INSTITUTE OF MEDICINE**

## Recommendations for Research on the Health of Military Women

1995

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**Recommendations for Research on  
the Health of Military Women**

Committee on Defense Women's Health Research

INSTITUTE OF MEDICINE

NATIONAL ACADEMY PRESS  
Washington, D.C. 1995

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## **Preface**

This report concerns a special group of women—active duty and reserve members of the U.S. Armed Forces. Their combined number approaches 350,000 and is growing. These women are vital to the conduct of military operations, and they must be fit and healthy to fulfill their military responsibilities. At the same time, they confront health risks and special situations that few other U.S. women encounter.

In response to congressional action, the Defense Women's Health Research Program was established to address the health of military women, especially as related to mission readiness, deployment, and training. This program is managed by the U.S. Army Medical Research and Materiel Command (the Command).

The Command asked the Institute of Medicine (IOM) for advice related to the program's use of the FY 1995 \$40 million appropriation. In particular, the IOM was asked to focus on two main topics: (1) gaps and strengths in past and current research relating to the health and performance of military women, and (2) guidance on establishing research funding priorities. The IOM appointed a 19-member committee with expertise in internal medicine, obstetrics and gynecology, dermatology, nursing, physiology, physical education/kinesiology, nutrition, pharmacology, psychiatry, psychology, social work, epidemiology, design of protective clothing, occupational and environmental health, and women's health. Of these committee members, eight had previous experience as a member of or a consultant to the Armed Forces. One committee member is a retired female Army officer and one is currently a female officer in the Naval Reserves and a member of the Defense Advisory Committee on Women in the Services (DACOWITS).

The committee addressed research in four general areas: clinical, occupational/environmental, physiological, and psychiatric/psychosocial issues. Part of the committee's work was conducted by working groups in those four areas. The primary focus was on the safety, health, and military effectiveness of military women, especially those deployed for training or operations in austere conditions.

The Command asked the committee to conduct an extensive search of relevant studies from the published literature and from government reports of funded research and to draw on the search results in preparing its report. The committee was further charged to recommend defense women's health research areas to be supported and to provide guidance for developing funding priorities. The extensive reference lists are included in a separate volume entitled *Recommendations for Research on the Health of Military Women: Bibliographies* and in an electronic database that also contains available abstracts. This report is to be used in the preparation of a Broad Agency Announcement about the research program and other aspects of program administration.

Because of the Command's need to disperse FY 1995 funds, the time frame for the committee's work was unusually short. Between mid-April and the end of May 1995, members assisted with the search strategies and processed large amounts of information, the working groups conferred, and the full committee met three times, deliberated, and developed its recommendations. The appendixes reflect only a portion of the information that was processed. The committee's extraordinary effort testifies to its view that the Defense Women's Health Research Program is an important program that is capable of supporting the best research and scientific effort, and is deserving of careful planning, management, and oversight.

The committee views the Defense Women's Health Research Program as an invaluable means of improving the health of military women and of women in general. The population of military women is unrivaled as a source of data that can be used to great advantage in studies to improve the short- and long-term health of young women of varied racial and ethnic backgrounds. The committee is concerned that the temporary nature of the funding limits the kinds of studies that can be undertaken. A stable funding base would permit more rigorous and longer-term studies of major impact on the health, well-being, readiness for deployment, and performance of military women, as well as providing information pertinent to the health of civilian women.

The chair and the committee are appreciative of the large staff provided to the committee. We especially wish to thank Kenneth I. Shine, IOM president; Karen Hein, executive officer; and Allison Yates, division director, who were instrumental in initiating the study. We especially appreciate the excellent work of Carol Suitor, study director, and the assistance of Rick

Manning and Paul Thomas, senior program officers; Cathy Liverman, who conducted the literature searches with assistance from librarians Laura Baird and Julie Walko; research assistants Carolyn Peters and Laura Colosi; project assistants Thomas Wetterhan and Patricia Takach; managing editor Mike Edington; and editors Florence Poillon and Linda Humphrey. We also wish to thank COL Irene Rich, Director, Research Area Directorate VI, Department of the Army, U.S. Army Medical Research and Materiel Command, for expediting information gathering, and the many members of the Armed Forces who provided information and perspectives to the committee.

The committee believes that the separately published bibliography of relevant literature and studies in progress, together with the committee's recommendations for new research, provide a useful basis for planning and implementing research for the military and civilian research communities.

Luella Klein, *Chair*



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## Summary

Approximately 340,000 women serve in the Armed Forces. They constitute 14 percent of the total active duty personnel and 16 percent of reservists; 40 percent of these women belong to a minority group. Military women (a term that applies to both active duty servicewomen and women in the reserve component) are generally young, healthy, and fit. However, from basic training to deployment in combat, military women experience physical challenges and psychological stresses that may include overuse injuries, feelings of loneliness and isolation, exposure to environmental extremes, and sexual harassment, as well as the need to cope with military equipment, clothing, and procedures designed largely for men.

To support research aimed at addressing the health-related needs of this population, the Defense Women's Health Research Program (DWHRP) was established in FY 1994. Congress provided \$40 million to the Department of Defense (DoD) in both FY 1994 and FY 1995, with the promise of additional funding in subsequent years, for intramural and extramural research relevant to the goals of the DWHRP. Those goals relate to mission readiness, deployment, and training. The DWHRP is managed by the U.S. Army Medical Research and Materiel Command (the Command).

The Command asked the Institute of Medicine (IOM) for guidance on the use of the appropriations for the DWHRP. Particular attention was to be directed toward such topics as psychological stressors, physiological stressors, nutritional status, occupational safety issues, design of equipment and clothing, and special health care needs—all as related to servicewomen in training or deployment situations. In response, the IOM appointed a 19-member committee (1) to identify gaps and strengths in past and current research

relating to the health and performance of military women, and (2) to provide guidance on establishing research funding priorities. The study staff conducted an extensive search of relevant studies from the published literature and from government reports of currently funded research. This process is described in Chapter 2, and bibliographies of relevant published works and current studies are found in appendixes to the report. The committee reviewed the extensive bibliographies with available abstracts and used a deliberative process and collective expert opinion to develop its recommendations.

### OVERARCHING RECOMMENDATIONS

The committee recommends that the following criteria be applied in setting priorities for those proposals that meet the basic funding considerations of scientific rigor and expertise of the investigators to conduct, complete, and disseminate research findings. The research problem or question should be:

1. *unique* to military women (e.g., a study of the potential reproductive toxicity of chemical weapons or medications used to counter them), or
2. especially *prevalent* among military women (e.g., a study of rapid diagnosis and treatment of sexually transmitted disease, or of stress fractures and other overuse injuries common in basic training), or
3. related to the ability of military women to *perform their mission responsibilities* (e.g., a study of the effect of premilitary abuse on response to violence and trauma).

Although the term "military women" applies to active duty servicewomen and women in the reserve component, the use of civilians or animals as subjects may be appropriate in some studies. Military women themselves are a key source of information and insights for investigators, and they should be involved in identifying their health concerns and investigating the solutions.

The committee recognizes the unusually large proportion of servicewomen from minority racial and ethnic groups. It strongly urges researchers to go beyond the statutory requirement for analysis of research by gender and minority subgroup (Defense Authorization Act for Fiscal Year 1994) and to actively promote studies that provide useful information about relationships, if any, between group membership and the health of women in the military.

To ensure maximum return for DoD's fiscal investment in women's health research, the committee proposes that rigorous peer review criteria be established and used for both intramural and extramural research.

The committee urges the Command to promote information exchange that can lead to strong collaborative partnerships involving DoD intramural efforts,

established academic institutions, federal agencies, and civilian research programs. A few examples include joint sponsorship of workshops and seminars; preparation of information packets for applicants; award of small grants explicitly to promote collaboration of outside investigators and their access to military populations; and encouragement of civilian scientists to explore opportunities for collaboration by visiting military laboratories. Furthermore, the committee urges the Command to require that intramural as well as extramural DWHRP awardees document and share their research findings by submitting manuscripts for publication in scientific, peer-reviewed journals.

#### **RECOMMENDATION FOR LONG-TERM RESEARCH ON THE HEALTH OF MILITARY WOMEN**

The committee recommends that DoD make a long-term commitment to research focused on the health of women in the military—including longitudinal studies of military women's health and the design, development, and maintenance of the databases required to support this type of research. As part of this effort, the committee further recommends continued development of both general and gender-specific databases that allow sharing of epidemiologic and other health data across the three services and with other researchers. To ensure continuity and utilization of information contained in comprehensive, large-scale databases on the health of military women, the committee recommends that the responsibility for their development and maintenance be assigned to single entities that would make information available to health facilities and clinicians in all the military services as well as to the research community.

An ongoing research program would enable DoD to take action to correct problems in women's health and women's health care that are only beginning to be recognized. With the growing proportion of women in the Armed Forces, such action would support mission readiness, mobilization, and deployment, and would promote women's health throughout their military careers and beyond. The committee recommends the formation of an ongoing Defense Women's Health Research advisory group to assist the long-term effort.

#### **RECOMMENDATIONS FOR RESEARCH AREAS**

The committee's recommendations of specific topics for research fall into four broad areas:

1. *Major factors affecting the health and work performance of military women:* Research is needed to address women's physiological, psychological, and behavioral responses to a combination of operational stressors such as extreme ambient temperature, intense physical activity, trauma, fatigue, and restrictive clothing. Women's nutrition; physical fitness; and gynecologic, reproductive, and psychological health must be studied in relation to their effects on performance of military responsibilities. Research is also needed to investigate gender-specific aspects of drug metabolism and action and to reduce limitations posed by protective clothing and equipment designed primarily for males.

2. *Psychological and health issues resulting from integration of women into a hierarchical male environment, or related to women and men living and working together in close quarters:* These issues include but are not limited to sexual harassment or physical abuse and maintaining privacy and self-respect in close quarters. Studies are needed on such topics as the extent and impact of stereotyping of military women, various aspects of physical and sexual assaults on military women, response to treatment for traumatized servicewomen, and clothing or equipment to facilitate normal elimination of body wastes.

3. *Health promotion and disease prevention:* This research area covers examination of the scientific basis, usefulness, and results of educational programs targeted to improve or maintain women's health. Among the many important topics are smoking cessation, the prevention of common problems such as vaginitis and urinary tract infections, the prevention of sexually transmitted diseases and unplanned pregnancy, the promotion of long-term bone health, the effectiveness of services' physical training and weight control programs in promoting the maintenance of fitness and body weight within specific standards throughout servicewomen's careers, and the prevalence of disordered eating and its relationship to weight and fitness standards and performance. Various aspects of occupational demands and exposures to potential health hazards (e.g., fuel vapors, electromagnetic radiation, smokes and obscurants, blast, munition residues, repetitive impact shock, prophylactic medications and immunizations, pesticides) need to be examined in relation to their effects, if any, on pregnancy outcomes.

4. *Access to and delivery of health care:* Health services research related to many aspects of the care of women in the military is clearly needed. One important area is the study of mechanisms for providing easy access to confidential, sensitive, high-quality gynecologic and reproductive care to women in field conditions. Possible approaches include the use of specially trained providers and self-care packs. Data about health care concerns and needs, obtained from the women themselves, need to be collected and analyzed. Health services research could also address the value of screening

programs (for pregnancy or sexually transmitted diseases), barriers to the use of mental health services and ways to reduce these barriers, the use of technology in delivering gender-specific care at remote sites (telemedicine), and health care requirements of women in the reserve component.

Recommendations in these four areas are described in more detail in chapter 3 of the report.

## **Introduction and Overview**

### **LEGISLATIVE BACKGROUND**

In recognition of the rapidly growing number of women in the country's Armed Forces and the unique challenges and stressors faced by these women, the Defense Authorization Act for Fiscal Year 1994 called on the Secretary of Defense to ensure that women and minority group service members are included in all clinical research projects in numbers sufficient to detect gender- or minority group-specific effects. It further authorized the secretary to establish a Defense Women's Health Research Center for "multidisciplinary and multi-institutional research on women's health issues related to service in the Armed Forces." Although the President's budget submission had not requested funds for such an effort, \$40 million dollars was provided in the 1994 Defense Appropriations Act.

The Secretary of Defense submitted an implementation plan to Congress in May 1994, which called for the establishment of a Defense Women's Health Research Program (DWHRP) rather than a single research center. The plan called for three major types of research: (1) epidemiologic research identifying the nature and scope of women's health issues relevant to military service, and the construction of centralized databases for this information; (2) research supporting the development of policies and standards related to training, operations, deployment, and retention; and (3) research emphasizing interventions that directly address issues impacting women's military service.

The U.S. Army was appointed the executive agent to manage the program and to maintain coordination with the other military services and federal agencies, with execution falling to the U.S. Army Medical Research and Development Command. In separate actions, the Command solicited proposals for intramural research at military laboratories and hospitals, and for



extramural research contracts with civilian institutions. The Army, Navy, and Air Force prioritized the submissions from their own facilities (with the Navy responsible for Marine Corps proposals). A tri-service panel of military medical scientists then produced an integrated priority list based on program relevance, tri-service application, critical service-unique needs, and near-term benefit to women service members. Extramural proposals underwent contracted peer review by a panel of military, government, and private sector scientists.

Of the \$40 million in funds appropriated for FY 1994, \$16 million had been awarded to 102 intramural projects (Institute of Medicine, 1995b) and \$20 million to 28 extramural projects at the completion of this report. Whereas the extramural projects were multiyear, pre-funded grants of up to four years' duration, the intramural projects had to be completed in one year.

The Defense Authorization Act for Fiscal Year 1995 directed the Secretary of Defense to continue the Defense Women's Health Program and authorized a second \$40 million (subsequently provided in the 1995 Defense Appropriations Act) for program activities, which it specified would include:

Epidemiologic research regarding women deployed for military operations including research on patterns of illness and injury, environmental and occupational hazards (including exposure to toxins), side-effects of pharmaceuticals used by women so deployed, psychological stress associated with military training, deployment, combat and other traumatic incidents, and other conditions of life, and human factor research regarding women so deployed.

Development of a data base to facilitate long-term research studies on issues related to the health of women in military service, and continued development and support of a women's health information clearinghouse to serve as an information resource for clinical, research, and policy issues affecting women in the Armed Forces.

Research on policies and standards issues, including research supporting the development of military standards related to training, operations, deployment, and retention and the relationship between such activities and factors affecting women's health.

Research on interventions having a potential for addressing conditions of military service that affect the health of women in the Armed Forces.

The Command (now renamed the U.S. Army Medical Research and Materiel Command) made several changes in its management of the FY 1995 DWHRP appropriation. Most importantly for the present study, the Institute of Medicine (IOM) was asked to serve as an independent source of advice on priorities for new research initiatives. Overall responsibility for managing the program was shifted to the director of the Command's Research Area VI, who

also oversees execution of the Army's congressionally mandated breast cancer research program. A tri-service steering committee was appointed to advise the director. Full competition was mandated for intramural as well as extramural research, with independent nongovernment peer review for both.

### **SPECIAL CONSIDERATIONS FOR MILITARY WOMEN'S HEALTH NEEDS**

The past decade has seen steadily increasing attention to the need to include women in clinical research of all kinds. Congress mandated the inclusion of women in all clinical research projects funded by the National Institutes of Health (NIH) and the Department of Defense (DoD), and offices of women's health now exist in many federal agencies. One of the first actions taken by the Office of Research on Women's Health at NIH was to convene a major conference on opportunities in women's health research. The report of that conference set forth a comprehensive agenda for national research efforts in women's health (Office of Research on Women's Health, 1992). Some elements of that agenda have already been addressed in the 14-year, \$625 million Women's Health Initiative at NIH and the greatly enhanced funding for breast cancer research at both NIH and DoD. Nevertheless, as the legislation establishing the DWHRP suggests, women in the military are a special population in many ways and face a host of health issues unlikely to be addressed by a purely civilian research program. The following sections provide a very brief description of these women and some of the challenges they face.

#### **Demographics**

In 1995, nearly 200,000 women were on active duty in the Armed Forces—comprising approximately 14 percent of the total (except as indicated, data in this section were provided via personal communications with DoD contacts who reported their source as either their service's personnel department or the Defense Manpower Data Center). Recruiting projections envision this percentage climbing as high as 20 percent in the near future. Approximately 36 percent of the women were in the Army, 34 percent in the Air Force, 27 percent in the Navy, and 4 percent in the Marine Corps. Across the services, nearly 40 percent of active duty women were classified as belonging to a minority group (31 percent African-American, 5 percent Hispanic, 2.5 percent Asian-American/Pacific Islander, 1.5 percent Native American and other). Minority group members comprise 53 percent of Army women, with African-American women alone accounting for 44 percent.

**TABLE 1-1** Number of Active Duty Women in the Four Armed Services by Age Group, February 1995

Age	Army	Navy	Marine Corps	Air Force	Total	%
≤20	9,354	10,489	2,094	8,402	30,339	15.6
21-25	23,320	15,807	2,760	19,528	61,415	31.6
26-30	14,653	9,880	1,235	13,711	39,479	20.3
31-35	11,174	8,323	896	10,832	31,198	16.1
36-40	7,145	5,236	563	8,050	20,994	10.8
41-45	2,839	2,169	161	3,343	8,512	4.4
>45	1,090	571	44	729	2,434	1.3
Total	69,548	52,475	7,753	64,595	194,371	100.0 <sup>a</sup>

<sup>a</sup>May not add to 100 because of rounding.

SOURCE: Defense Manpower Data Center.

Tables 1-1 and 1-2 show the distribution of women by age group and rank. The age distribution is a very skewed one, with women under the age of 26 making up more than half of the population and women over 40 comprising only 6 percent of active duty females. Women are as well represented in the officer ranks (12.8 percent of all officers) as they are in the enlisted (12.5 percent of all enlisted personnel). Less than half of the active duty women are married, compared with two-thirds of the active duty men. Although single parents of either sex are ineligible to *join* the Armed Forces, a 1990 study of Navy personnel estimated that 11 percent of active duty women (and about 2.6 percent of men) are single parents having one or more dependent children living with them (Thomas and Thomas, 1993).

Figures 1-1 and 1-2 provide some data on the types of jobs held by active duty female officers and enlisted women, respectively. Health care and supply/administration are the dominant occupations, but regardless of primary military occupational specialty, all military women (and men) must be ready to perform their primary tasks and other duties as assigned in conditions seldom experienced by their civilian counterparts (see section "Occupational Demands").

**TABLE 1-2** Rank Distribution of Active Duty Women in the Four Services, February 1995

Service	Officers		Enlisted Personnel	
	No. Female	% Female	No. Female	% Female
Army	10,256	13.3	59,394	13.4
Navy	7,754	12.9	44,728	11.7
Marine Corps	690	3.6	7,588	4.7
Air Force	12,069	15.3	52,517	15.9
Department of Defense	30,635	12.8	163,785	12.5

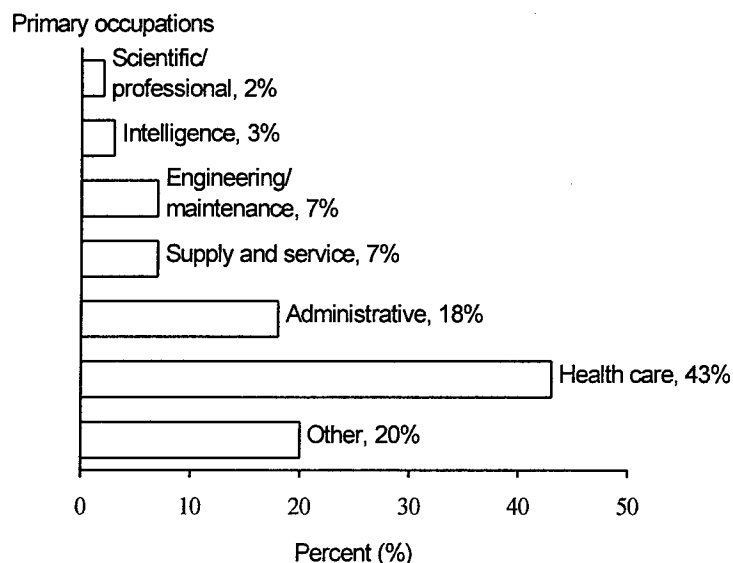
SOURCE: Defense Manpower Data Center.

No description of women in the military would be complete without some consideration of the reserve components. Here, approximately 140,000 women constitute an even higher proportion of the force (16 percent) than their active duty counterparts. The Persian Gulf War showed how heavily the U.S. Armed Forces depend on reserve components to conduct large-scale military operations. Twenty percent of the force deployed to the Gulf was from the reserves, and certain wartime tasks were performed entirely by individuals and units from the reserve forces.

### Health-related Requirements

Women in the military are a select population in additional ways: (1) they are a generally healthy population since they must meet a number of criteria to enter and remain in the military; and (2) all active duty personnel (and reserves, when actually on duty) receive a wide array of health services, including prescription medications, at no cost. As noted below, many of these health services are mandatory.

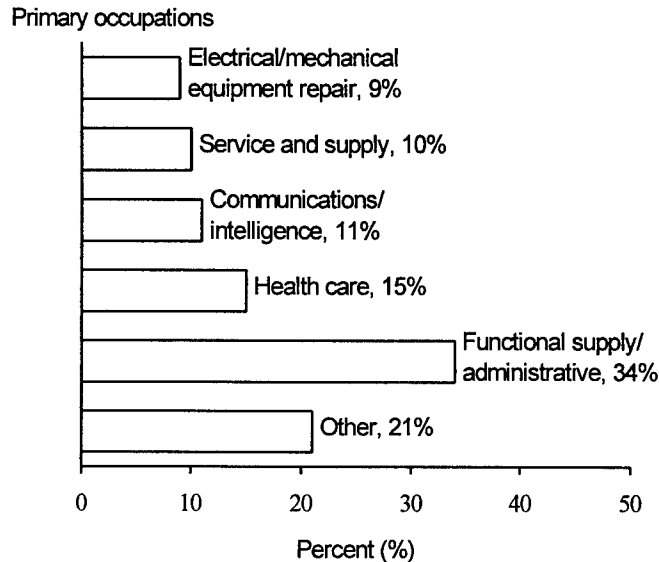
To enter the Armed Forces, the individual (with few exceptions, a 17- to 35-year-old with at least a high school diploma and no record of serious legal problems) must be free of contagious diseases that would be likely to endanger the health of other personnel, and free of chronic diseases, medical conditions, or physical disabilities that would preclude satisfactory completion of the required training, result in excessive time lost from duty, or put geographic limits on deployment.



**FIGURE 1-1** Primary occupations of active duty women officers. SOURCE: Adapted from *Military Women in the Department of Defense*.

A complete physical examination is required every five years (more often after the age of 40) and provided to both active and reserve personnel. If a service member develops a debilitating medical, physical, or mental condition while in the service, the need for restricted duty or discharge is decided on an individual basis by a standing panel of physicians. Thus, although a person with any form of diabetes mellitus, for example, would be ineligible to enter the Armed Forces, one who develops the condition while in the service might be retained on active duty but be restricted to assignments in which a reliable supply of insulin and the means for storing it are readily available.

All service members (reserve as well as active component) are evaluated at scheduled intervals (once or twice yearly at a minimum) for compliance with weight and fitness standards established by their service. The weight standards are gender- and height-specific, while the fitness standards are gender- and age-specific. All four services assess cardiorespiratory endurance, and the Army, Navy, and Marine Corps also test strength and flexibility. A 25-year-old Army woman, for example, must perform 16 push-ups in 2 minutes, 45 situps in 2 minutes, and run 2 miles in less than 19 minutes 36 seconds, with no more than 10 minutes rest between the three component "events."



**FIGURE 1-2** Primary occupations of active duty enlisted women. SOURCE: Adapted from *Military Women in the Department of Defense*.

Repeated failure to meet either weight or fitness standards results in remedial action (supervised dieting and/or exercise) and may ultimately lead to discharge.

### Health Services Provided

By policy, both active duty service members and reservists are required to participate in health maintenance programs that include the following:

1. Services provided to active duty women by military medical facilities (reservists must provide documentation from a private physician):

- annual Pap smears;
- breast examinations; and
- a baseline mammogram if over age 40, routine updates thereafter, and yearly mammograms after age 50;

2. Services provided to all as necessary by military medical facilities:

- annual screening for human immunodeficiency virus and cholesterol;
- routine immunizations, annual influenza immunizations, immunization against hepatitis B if at risk because of medical responsibilities, and immunizations specific to overseas deployment; and
- random urine testing for drugs of abuse.

Counseling on family planning and contraception (and appropriate means) is offered during the annual appointment for breast examination and Pap smear, and every visit to a health care facility includes a blood pressure check and advice or referral as indicated. Brief questionnaires on smoking, drinking, and diet (Health Risk Appraisal) are also administered at least annually and used for counseling.

### Health Behaviors of Military Personnel

The 1992 *Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel* (Bray et al., 1992) asked a sample of more than 16,000 active duty service members a wide range of questions concerning their health. Unfortunately, no comparable data are available for reservists. Some of the data of special import for women's health research are summarized here. In some cases the data are not available by gender.

- More than 50 percent of all active duty service members engaged in strenuous physical activity for 20 minutes or more at least three days per week in the month preceding the survey.
- Only 9 percent of all military personnel reported being identified as overweight in the previous year.
- Nearly 100 percent of active duty women reported having a Pap smear within the past 12 months.
- Approximately 66 percent of service members recalled having their blood pressure checked in the past year, and 90 percent of those identified with hypertension were taking action to control their blood pressure.
- About 36 percent of service members recalled having their cholesterol level checked in the past year.
- Approximately 50 percent of all unmarried military individuals reported using a condom during their last sexual intercourse.
- Only 6.2 percent of DoD personnel surveyed reported illicit drug use in the previous 12 months.

Although smoking is currently banned in all DoD facilities, and all of the services offer educational and smoking cessation programs, 31 percent of

active duty females smoke, far above the Healthy People 2000 goal of 20 percent or less, and more than 17 percent are heavy smokers (one pack or more of cigarettes daily). Among civilian women, heavy smoking is less common (12 percent).

Similarly, although DoD offers health promotion and safety education programs to emphasize responsible alcohol use, 4.4 percent of female survey respondents reported heavy drinking (five or more drinks on at least one occasion per week), compared with the 3.5 percent of civilian women reported by the National Household Survey on Drug Abuse (National Institute on Drug Abuse, 1991). Of military women, 30 percent are nondrinkers—far below the proportion of abstainers among civilian women (47 percent).

A substantial number of planned and unplanned pregnancies occur in this young, healthy, fit population. Point-in-time self-report data from the Navy (Thomas and Edwards, 1989; Thomas and Thomas, 1993) have consistently shown about 8 to 9 percent of enlisted women pregnant. Navy hospital records (Calderon, 1994) on the annual number of pregnancies yield about the same 8 to 9 percent when divided by the average number of active duty Navy females. Women under age 25 accounted for almost two-thirds of pregnancies (65 percent of the total in the 1992 survey). Like their civilian counterparts (Forrest, 1994), more than half of these younger servicewomen reported that the pregnancy was unplanned, although 56 percent of those reporting an unplanned pregnancy also reported they had been using birth control, most commonly condoms or the pill.

Another frequent consequence of sex is sexually transmitted disease (STD). Preliminary results from a large-scale survey of active duty Army personnel show 18 percent of women respondents reporting at least one STD over a two-year period (Jenkins and Nannis, 1995).

### **Occupational Demands**

Despite the advantages of being a young, healthy, fit population, military women (and their health care providers) face many challenges not generally encountered by their civilian peers. Depending on their assignment, military women may be exposed to any combination of the following conditions or situations that pose physical and psychological threats.

All military personnel initially experience the physical challenges of basic training, which may be extreme, depending on their initial fitness level. Stress fractures and other overuse injuries are common, especially among female recruits (Jones et al., 1993; Pester and Smith, 1992; Ross and Woodward, 1994). Heat injuries are a danger for much of the year, given the location of current basic training sites. Psychological stress (fear of injury or fear of failure) is introduced deliberately as part of the training, and absence from



duty, even for good medical reasons, may mean a repetition of some or all of basic training. These experiences occur far from home, friends, and family—the traditional sources of advice, encouragement, and help in difficult times.

Once through basic training, the new soldier, sailor, marine, or airman [sic] is again separated from now familiar sources of social support and faced with learning the specifics of a military specialty, often involving equipment and procedures that evolved in a completely male work force. Risk of injury is always elevated for the novice—a risk driven higher for women when clothing, equipment, tools, protective gear, and prescribed methods have been designed for men.

Deployment—whether for training, humanitarian purposes, peacekeeping missions, or combat operations—impacts on health care in a host of ways. Austere conditions are the rule, whether at field training sites in the United States, on board ships at sea, or in improvised base camps in a foreign country (U.S. General Accounting Office, 1993). Geography and weather are frequently harsh—troops arriving in Saudi Arabia at the start of the prewar buildup stepped off the plane into 125°F heat. Housing and sanitary facilities are often primitive—many Gulf War soldiers slept elbow to elbow in warehouses or tents for weeks before the war began, sharing outdoor cold water showers and hastily built plywood outhouses. Some were required to subsist for extended periods (30 to 60 days) on combat rations that were designed and tested almost exclusively with male soldiers. Once the war began, they slept in their vehicles, dug slit trench latrines, and had little or no access to shower facilities. Because transportation is critical, space and thus supplies are limited. “Bullets, beans, and bandages” are the traditional priorities, but medical care is limited by both the dispersion of troops (or ships) and by the necessity for compact, mobile facilities.

Deployment may also entail exposure to some diseases that are unfamiliar to most Americans. Leishmaniasis, a parasitic disease commonly found in the subtropics and tropics, is an example from the Persian Gulf War. Prophylactic medications (e.g., mefloquine or doxycycline in locations where malaria is endemic) and immunizations help protect American troops against many diseases endemic to overseas areas, and also against potential agents of biological warfare such as anthrax. The recent outbreak of Ebola virus in Zaire, however, illustrates the potential for unknown dangers. Each new medication and vaccine also presents a small but measurable risk of adverse effects.

Repeal of the Combat Exclusion Law opened up many dangerous jobs to women. Women are now flying combat aircraft and serving on combat ships from aircraft carriers to destroyers. Although still excluded from direct ground combat units in the Army and Marine Corps, women in combat support units will be close enough to the front lines to be endangered by enemy artillery, aircraft, SCUD missiles, and other indirect fire. Protection against chemical

warfare agents may involve prophylactic "pretreatment" with drugs such as pyridostigmine (a medication that counteracts the effects of organophosphate "nerve gas") for weeks at a time. Copious use of fuels and lubricants (with attendant exhaust), pesticides, and insecticides adds to dust and smoke as potential health hazards. As the controversy over "Persian Gulf Syndrome" shows, the danger to men, women, and fetuses from exposure to these substances, alone or in combination, is still not clear (National Institutes of Technology Assessment Workshop Panel, 1994; U.S. General Accounting Office, 1994; Institute of Medicine, 1995). Electromagnetic radiation (from laser range finders and target designators; radio-frequency, microwave, and millimeter-wave communications; and electronic warfare equipment) represents another potential military health hazard, in or out of combat environments.

Combat stress reactions and post-traumatic stress disorder (PTSD) have been major sources of morbidity in and after past conflicts. Military doctrine now recognizes that psychological symptoms are an expected consequence of witnessing or participating in the horrors of war. Much less is known about possible gender differences in the nature, intensity, and optimal treatment of such responses to stress (Baum and Grunberg, 1991; Wolfe et al., 1993).

Other psychological health issues arise from the necessity of sharing close quarters with largely male peers for extended periods. In a recent Navy study of sexual harassment (Culbertson and Rosenfeld, 1994), 44 percent of 6,300 enlisted women surveyed in 1991 reported that they had been sexually harassed during the previous 12 months. More than half of those harassed reported that they had developed symptoms such as headaches, difficulty sleeping, or nausea. As a result, 7 percent went on sick call, and 16 percent took unplanned leave, accounting for some 450,000 hours away from work.

### SUMMARY

By necessity, the foregoing material represents only a brief sketch of some of the special considerations in the analysis of military women's health needs. However, it demonstrates the rationale behind congressional concern for the health of women service members, illustrates some reasons why research is needed specifically for military women, and provides an overview of some of the issues that the IOM committee considered when starting to analyze what that research should include.

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## **Methods**

The committee process involved extensive information gathering; examination of citations, abstracts, and other findings; and deliberations that directed this acquisition of information and were informed in part by those findings. Recommendations are based on the collective opinion of the expert committee. Information gathering and search results are described below.

### **INFORMATION GATHERING**

To provide a partial basis for recommendations, the committee examined results from extensive online searches of the published research literature relevant to the health of military women. To avoid making recommendations that would duplicate ongoing research, information gathering also included (1) extensive searching of current research databases; (2) contacting federal agencies and offices; and (3) contacting representatives of the Army, Navy, and Air Force. Research pertaining to breast cancer was purposely omitted, since it is the subject of a separate Department of Defense (DoD) research program. The committee advised project staff on general parameters for information gathering. Each of four working groups (clinical, occupational/environmental, physiological, and psychosocial) provided detailed guidance concerning databases, search strategies, and other aspects of data retrieval.

**TABLE 2-1** Online Databases Searched**Bibliographic Databases**

Agricola  
 Dissertation Abstracts  
 EMBASE  
 ERIC (Educational Resources Information Center)  
 Health Services/Technology Assessment Research (HStar)  
 Medline  
 National Technical Information Service (NTIS)  
 Occupational Safety and Health  
 PsycInfo  
 Social SciSearch  
 Sociological Abstracts  
 SpaceLine (in development by the National Library of Medicine)  
 Sport  
 Technical Report (on the Defense RDT&E<sup>a</sup> Online System)  
 Textile Technology Digest  
 Toxline

**Current Research Databases**

CRIS/USDA (Current Research Information System)  
 Federal Research in Progress  
 Work Unit (on the Defense RDT&E<sup>a</sup> Online System)

<sup>a</sup>Research, Development, Testing, and Evaluation.

**Online Databases**

Eighteen databases covering scientific research were accessed using Dialog, a commercial database vendor; the National Library of Medicine's (NLM's) Medical Literature Analysis and Retrieval System (MEDLARS); and the Defense Technical Information Center's Defense Research, Development, Testing, and Evaluation Online System (DROLS) (Table 2-1). Although there is subject and content overlap, each database searched serves a unique function, has a distinct subject emphasis that is relevant to the study, and indexes information not available elsewhere.

The committee judged that a search of citations from 1985 through the present (May 1995) would provide adequate coverage of completed research on women.

With ongoing input from committee members, the Institute of Medicine (IOM) staff used a series of search strategies (see Institute of Medicine, 1995). When available, database thesauri, including the Medical Subject Headings

(MeSH) thesaurus for Medline, were used to locate specific terms that would maximize retrieval. Free text searching was also used. When possible gaps in the research were identified and search strategies were reexamined and expanded as appropriate to determine whether those gaps were real.

Preliminary searches of the published literature were quite broad in terms of the study populations. Military personnel, working women, female athletes, or gender differences were among the possible options. After examination of preliminary search results, the committee narrowed most searches of the published literature to military personnel or military women (see Table 2-2). Searches of current research were conducted for women, generally excluding elderly women.

The broad scope of the searching resulted in retrieval of more than 5,700 citations of published works and 2,600 citations for current research. All of these citations were converted into a new format for inclusion in either the bibliographic or the current research database. Citations that were obviously not relevant to the study were deleted by project staff.

Staff implemented an indexing scheme to organize the citations for convenient use by appropriate committee members and searched the new databases in many ways. Committee members received a set of citations and abstracts for their assigned areas. Supplementary topical bibliographies with abstracts were distributed periodically. Committee members identified citations that were to be deleted because of lack of relevance to military women's health research.

At the conclusion of the study, the database covering published works contained more than 2,100 references to relevant research on women's health, and the database covering current research contained more than 1,100 references.

### **Other Information Sources**

Project staff contacted a number of other information sources: Department of Defense personnel, federal offices and agencies (Table 2-3), the Defense Advisory Committee on Women in the Services (DACOWITS), and publications on the status of women's health in the U.S. civilian population. Background documents and listings of current studies were received from many of the contact persons. These materials were reviewed by staff and committee members for relevance to the study. In addition, the committee reviewed a copy of the interim report of the Institute for the Advancement of Social Work Research (IASWR), Defense Women's Health Research Program (DWHRP), Strategic Planning Committee. The IASWR committee developed

TABLE 2-2 Basic Search Strategies for Published Literature<sup>a</sup>

Search Terms	Search Population					
	Military Women	All Military Personnel	Gender Differences	Women Athletes	Other Occupations	
<b>Psychological/Psychosocial</b>						
Post-traumatic stress disorder or PTSD or psychological stress or psychophysiologic disorders		X	X		X	
Substance abuse or drug abuse or alcohol abuse or tobacco or depression or suicide	X					
Family issues or separation or isolation or combat or single parent	X					
Violence or rape or sexual assault or sexual harassment or child abuse	X					
Job stress or training stress or readiness or retention or job satisfaction or job readiness or deployment	X					
Social support or community resource or unit support	X					
<b>Occupational/Environmental</b>						
Occupational exposure or occupational health or hazardous substances or occupational diseases		X	X			



Neurotoxicity or reproductive toxicity or immunotoxicity or hepatotoxicity or respiratory toxicity or cardiovascular toxicity or dermatotoxicity or nephrotoxicity

X

X

Organophosphates or oil fumes or pollutants or air pollution or radiation or electromagnetic fields or pesticides or insecticides

X

X

Viruses or bacteria or protozoa or fungi or infectious agents or biologicals or communicable diseases or infectious diseases

X

Protective devices or protective clothing or thermal properties

X

Hyperbaric pressure or hypobaric pressure

X

X

Anthropometry or weight bearing or load bearing or equipment design or biomechanics

X

X

Athletic injuries or fractures or sprains or strains or musculoskeletal injuries

X

X

#### Clinical

Blood pressure or cardiovascular diseases or cholesterol or headache or migraine or breast diseases or mammograms or pulmonary diseases or respiratory diseases or immune complex diseases or skin diseases or hearing disorders or hearing loss or auditory loss or vision disorders or neuromuscular diseases or digestive system diseases

X

*Continued*

TABLE 2-2 Continued

Search Terms	Search Population				
	Military Women	All Military Personnel	Gender Differences	Women Athletes	Other Occupations
<b>Clinical continued</b>					
Sexually transmitted diseases or vaginitis or cystitis or urinary tract infections or urinary incontinence or fecal incontinence or bladder prolapse or pelvic prolapse or procidentia or cystocele or rectocele or musculoskeletal diseases or otorhinolaryngologic diseases	X				
Menstrual cycle or menstruation or menstrual disorders or contraceptive agents or birth control or fetus or fetal or pregnancy or pregnancy complications or infant or fertility or postpartum or puerperium or lactation or lactation disorders or breast feeding or infertility or gynecological disorders	X			X	
Rheumatology or arthritis or bursitis		X		X	
Telemedicine or health needs or health status or delivery of health care or health care services	X				

## Physiological

Biological products or anthelmintics or antidiarrheals or anti-inflammatory agents or antidotes or antibiotics or contraceptive agents or anesthetics or bronchodilator agents or antihistamines or analgesics or estrogen replacement therapy or altitude sickness-drug therapy or vaccines or vaccination or antihypertensive agents or motion sickness-drug therapy or pharmacokinetics or pharmacodynamics or drug metabolism

X

X

Physical fitness or muscle contraction or muscles-physiology or exercise or psychomotor performance or bone density or arm-physiology or pectoralis muscles or upper body strength

X

X

Resistance training or weight training or weight lifting or postpartum fitness

X

X

Nutrition assessment or nutritional status or nutritional requirements or caloric intake or eating disorders

X

X

Vitamins or antioxidants or substrate utilization or glucose utilization or free fatty acids or nutritional supplements or calcium or iron or gastrointestinal absorption or immune function or renal function or reaction time or athlete triad or female triad

X

X

*Continued*

TABLE 2-2 Continued

Search Terms	Search Population				
	Military Women	All Military Personnel	Gender Differences	Women Athletes	Other Occupations
<b>Physiological continued</b>					
Heat-adverse effects or cold-adverse effects or hypothermia or humidity or food deprivation or hunger or water deprivation or thirst or fatigue or body temperature regulation or sleep deprivation or noise or sensory thresholds or water electrolyte imbalance or vasoconstriction or altitude or work capacity evaluation or heat exhaustion or exertion or acceleration or stress-physiological or circadian rhythm or jet lag			X		
Body weight or adipose tissue or body mass index or skinfold thickness or obesity or body composition or body fat or fat distribution or densitometry or body weight standards		X		X	
Circadian rhythm or jet lag	X			X	
Dark adaptation or sunlight or luminescence or ultraviolet light or lasers		X			

NOTE: This is a list of the primary terms used. Some terms were truncated or proximity searched to maximize retrieval. When available, database hierarchical structures were utilized (e.g., MeSH tree structures) to retrieve subordinate terms.

\*For more information, see Institute of Medicine, 1995.

**TABLE 2-3** Federal Agencies Contacted**U.S. Department of Agriculture**

Agricultural Research Service

National Program Staff

National Research Initiative Competitive Grants Program, Cooperative State

Research, Education and Extension Service

Food and Consumer Services

Office of Analysis and Evaluation

**Department of Commerce****Department of Education****Department of Energy****Department of Health and Human Services, Public Health Service**

Agency for Health Care Policy and Research

Centers for Disease Control and Prevention

Food and Drug Administration

Maternal and Child Health Bureau

National Institutes of Health, including the Office of Women's Health Research

Office for Women's Health, Public Health Service

Substance Abuse and Mental Health Services Administration

**Department of State**

U.S. Agency for International Development

**Department of Transportation**

U.S. Coast Guard

recommendations for the inclusion of psychosocial research within a broadly defined investment strategy for the DWHRP.

Of special interest was information provided by DACOWITS. This committee of nonfederal government civilian women and men, which serves without remuneration, "... assist[s] and advise[s] the Secretary of Defense on policies and matters relating to women in the Military Services. In its advisory capacity, DACOWITS recommends measures to ensure the effective utilization of women in the Armed Forces" (U.S. Department of Defense, 1995). It develops its recommendations from formal testimony at periodic meetings and from confidential interviews with servicewomen during visits to installations across the United States and overseas. Some of the topics it addresses are related to women's health, and many DACOWITS recommendations provided perspectives that the committee considered during its deliberations.

Representatives of the Armed Forces provided several kinds of information for the committee's review:

- listings of current intramural and extramural projects funded through the DWHRP;

- reports covering other major military programs in health-related research;
- listings of clinical protocols and the clinical investigation programs of military hospitals; and
- selected demographic and health status data concerning military women (not all requested information was available).

Seventeen military and civilian representatives of the Armed Forces gave presentations to the committee and responded to immediate and postmeeting questions. Committee members also obtained anecdotal information informally from a small number of servicewomen.

## SEARCH RESULTS

### Published and Current Studies

Listings of relevant research results are available in electronic and published form (Institute of Medicine, 1995).<sup>1</sup> These include a bibliographic listing of relevant search results from the published literature, organized by topic areas that the committee judged to be especially important, and a similar listing of research in progress. Of special note is the list of the intramural and extramural research funded with FY 1994 appropriations by DWHRP.<sup>2</sup> Any studies that had not been entered in the Federal Research in Progress, Current Research Information Service, or Work Unit databases or that had not been provided by the sponsoring agency were unavailable for review by the committee and are therefore missing from these listings.

For both published and current research, citations were generally omitted if they covered health care problems that make servicewomen ineligible for deployment. Examples include chronic obstructive pulmonary disease, myocardial infarction, human immunodeficiency virus (HIV) infection, and diabetes mellitus. Many studies that dealt with the prevention of chronic diseases were included.

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<sup>1</sup>For ordering information, see the verso title page of this book.

<sup>2</sup>Information about extramural research awards was not public when *Recommendations for Research on the Health of Military Women: Bibliographies* went to press.

*Limitations of the Review of Published and Current Studies*

Having access only to citations and abstracts (and in some cases citations only), committee members did not attempt to assess the quality of the published or current studies. Moreover, committee members did not attempt to explore all aspects of a specific topic as would be done if they were preparing a research proposal in a specified area. Rather, they looked for information about a number of factors, including the following:

- the number of studies in an area;
- the range of studies that addressed the topic;
- the approaches used in addressing the topic;
- the extent to which women had been used as participants and results analyzed separately;
- the extent to which ethnic background was considered;
- whether the phase of the menstrual cycle was considered, if applicable;
- military relevance if not conducted with military subjects; and
- applicability to U.S. women if study participants were from other countries.

The bibliographies include some studies that are overtly flawed or that committee members considered might be seriously flawed (Institute of Medicine, 1995). The committee includes them because they are a part of the information processed. No indications of quality are to be assumed.

*Uses for Listings of Published and Current Studies*

Potential investigators, current investigators, and Armed Forces practitioners can all benefit from the listings of published works and the listings of research in progress (Institute of Medicine, 1995). Because of the large number of databases searched, these listings include studies that might be missed by routine searching and that might provide leads for other searches. The topical bibliographic listings provide a convenient starting point for a targeted, critical review of the literature. The topical listings of current research can stimulate communication among investigators with related interests. Review of the combination of published works and work in progress can suggest further aspects of research that have been ignored or require more attention.

### Other Types of Information

#### *Material from DACOWITS*

The committee identified several recurrent, relevant recommendations in the materials from DACOWITS:<sup>3</sup>

- actions to improve the quality, availability, and affordability of child care;
- strict enforcement of a zero-tolerance policy of sexual harassment in the services and service academies, and systems to ensure its implementation;
- assessment of the need for routine obstetric and gynecologic care for servicewomen, especially those at foreign or isolated locations, and follow-up to ensure that these needs are met; and
- extension of opportunities to women in terms of positions and training.

The following concerns were among those identified during the 1994 fall DACOWITS conference visits to installations or in the special presentation for this study:

- methods of addressing women's health care that do not set women apart from men;
- various effects of unplanned pregnancies on the individual, military women, and the unit;
- various aspects of weight and physical training standards, with specific concern about disordered eating;
- fit of uniforms, boots, and masks;
- avoidance of artificial separations for the women (e.g., overconcern for special female facilities);
- methods to ensure equitable assignment to leadership, training, and career development; and
- access to the type of health care sought.

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<sup>3</sup>Excerpts from "Recommendations from Defense Advisory Committee on Women in the Services (DACOWITS)," a compilation presented to the Committee on Defense Women's Health Research. Entries were from fall 1968 through fall 1994, with some gaps in the early years.



*Military Health-related Databases*

Military medical researchers provided an overview of databases and other sources of health information about women in the military. The first issue (April 1995) of *Medical Surveillance Monthly Report* (MSMR), an Army publication, was made available to the committee. This publication includes gender-specific data about "notifiable conditions" (including the environmental injuries of heat and cold exposure and carbon monoxide intoxication), active duty hospital sick days by diagnostic category, and notifiable sexually transmitted diseases.

MSMR draws on several major data sources:

- The Individual Patient Data System (IPDS) collects information about all hospitalizations in Army medical facilities. The Navy and Air Force use the same software to collect data from their hospitals and clinics. These databases are concerned solely with inpatients. The data from the three services are apparently not pooled (John F. Brundage, U.S. Army Center for Health Promotion and Preventive Medicine [USACHPPM], personal communication, 1995), but all are archived at the Defense Manpower Data Center in Monterey, California.
- The Army Disability Agency maintains a database on every person leaving the Army with a medical disability. This is primarily a legal/financial document and is not routinely open to researchers.
- An extensive database on HIV-related research, including epidemiology and natural histories of HIV-positive service members. (Patient confidentiality is, of course, a major consideration in the use of the latter data, since the numbers are relatively small.)
- The Automated Central Tumor Registry. Every tumor diagnosed in an Army laboratory is automatically entered into this database.

Currently, ambulatory data are not available for research on issues of everyday importance to women's health. There is no system that collects outpatient data in the same fashion as the IPDS does for in-patients. The preventive medicine services at all Army facilities provide reports of "notifiable conditions" to USACHPPM. All but four of the facilities provide the data electronically. The Navy and Air Force have similar systems, but provide only paper reports. No other outpatient data are aggregated above the individual hospital level, despite the fact that most (if not all) Defense Department medical facilities employ a computer system called the Composite Health Care System (CHCS) to facilitate the efficient delivery of outpatient care. In effect, the CHCS was designed and is used to make clinical operations as paperless as possible; it handles prescriptions, laboratory results, radiology

consults, and referrals, among other things. A standardized computerized ambulatory data record is being developed. Although envisioned as a management tool, this data record may ultimately prove useful for research and development activities.

A number of databases are currently in the development stage with 1994 funding from the Defense Women's Health Program (see Institute of Medicine, 1995). These include a tri-service relational database to allow timely sharing of data about the incidence of illness and injury in military women among the services; a relational database, consultation, and decision-aiding system; and a database covering health issues for women aboard Navy vessels. In addition, a number of projects have been funded to survey military women concerning various aspects of their health and health care.

### SUMMARY

In the short period available, the committee examined the results of extensive online database searches and other kinds of information related to the health and performance of military women. The results of the information-gathering process documented a lack of easily accessible comprehensive information about the health of these women. These results also revealed that the Defense Women's Health Research Program's first year of operation has initiated important research targeted to the health of military women, including steps to help define their health status and problems. Above all, the research findings provided an empirical guide to the committee's attempts to identify strengths and gaps in defense women's health research.

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## Conclusions and Recommendations

Research undertaken to promote and sustain the physical and mental health of military women—both active duty and reserve—holds great promise for contributing to the military services' readiness and operational effectiveness. Moreover, the Department of Defense (DoD) affords an unrivaled opportunity to conduct research on women's health and health services because of the large number of women from different racial and ethnic groups who meet similar criteria and for whom there are similar records. The committee applauds the focus on women's health and the tri-service approach that are integral aspects of the Defense Women's Health Research Program (DWHRP).

### CONCLUSIONS

Based on its broad search of bibliographic databases and other information sources, as well as its extensive deliberations, the committee affirms the importance of basic elements of DWHRP: epidemiologic research concerning the health of deployed military women, development of one or more databases to facilitate long-term research in this area, and development and support of a military women's health information clearinghouse (see chapter 1). There is clearly a need for research relating to military women's health issues, but there are also barriers to accessing data that have been collected, and the dissemination of research results has been limited. Some excellent military reports have had little dissemination beyond the military. Assuming that the experience of this committee is typical, the availability and accessibility of information need to be improved. Availability and accessibility of relevant data, including

ambulatory data on issues of everyday importance to women's health, are crucial to future planning for research.

The bibliographies prepared by the committee (Institute of Medicine, 1995) list published and current research that may be relevant to the health of military women. To keep the number of references manageable, published works have been limited almost entirely to those dealing with military personnel or female athletes. Many studies are from DoD health research programs that have used *servicemen* as subjects and provide useful information about specific topics, but the results are not necessarily transferable to *servicewomen*. Similarly, studies of female athletes may be informative but not directly applicable to military women. The listings of current relevant studies includes many that are funded by the National Institutes of Health, U.S. Department of Agriculture, or other civilian sources. Strong research programs are under way in a number of areas of women's health (e.g., sexually transmitted diseases including human immunodeficiency virus (HIV) infection, other genitourinary conditions, birth control methods, hormone replacement therapy, and the prevention of cardiovascular disease and osteoporosis). The committee concluded, however, that the active civilian research program needs to be complemented by the DWHRP. Unique features and requirements of life in the military warrant special consideration in studies of military women.

The listings of current intramural projects funded by DWHRP (Institute of Medicine, 1995), show that the program has begun to delineate health concerns of military women and to address a number of important concerns. These include but are not limited to chemoprophylaxis, exercise-induced incontinence, a variety of aspects of strength training and testing, effects of nutrition on immune status, and responses of women to a variety of stressors.

## OVERARCHING RECOMMENDATIONS

### Funding Priorities

The committee recognizes that research questions concerning military women's health far exceed current and future fiscal resources. Therefore, it is necessary to establish priorities to ensure the maximum utility of and return on DoD women's health research investments. Scientific rigor and the expertise of the investigators to conduct, complete, and disseminate research findings are baseline requirements for the consideration of DWHRP research proposals. Failure to meet these basic standards should disqualify proposals from further funding consideration. Basic, applied, and health services research are all acceptable if targeted appropriately.

The committee recommends that the following criteria be applied in setting priorities for those proposals that meet basic funding considerations: the research problem or question should be (1) *unique* to military women (e.g., a study of the potential reproductive toxicity of chemical weapons or medications used to counter them); (2) especially *prevalent* among military women (e.g., a study of rapid diagnosis and treatment of sexually transmitted disease); or (3) related to the capacity or limitation of military women to *perform their mission responsibilities* (e.g., a study of the effect of premilitary abuse on psychological response to violence and trauma). The term "military women" applies to both active duty servicewomen and women in the reserve component. However, depending on the research question, the use of civilians or animals as subjects may be appropriate.

The committee recognizes the unusually large proportion of servicewomen from minority racial and ethnic groups and the relative homogeneity of educational background and current economic status of servicewomen of comparable rank. It strongly urges researchers to go beyond the statutory requirement for analysis of clinical research by gender and minority subgroup (Defense Authorization Act for Fiscal Year 1994) and to actively promote studies that provide useful information about relationships, if any, between group membership and the health and performance of women in the military.

### Peer Review

To ensure maximum return for DoD's fiscal investment in women's health research, the following criteria are proposed for both intramural and extramural research. Each proposal must meet the same requirements and go through peer review.

#### *Administration*

Each peer review chairperson should be a nationally recognized scientist with expertise in the field of review. This chairperson should have previous experience with national peer review processes, including the appropriate inclusion of women and minorities in clinical studies as directed by Congress.

#### *Composition of the Peer Review Panel*

Each panel should comprise members representing expertise in each of the fields of review. Panel members should represent multiple disciplines and a

wide variety of scientific, teaching, professional, and military experiences. These members should be diversified in terms of their gender and racial or ethnic backgrounds. In addition, panels should have active duty female service members with varied military experiences, whose role would be to provide the consumer's perspective and provide insight regarding health issues of importance to military women. Explicit steps should be taken to preclude personal and professional conflicts of interest.

#### *Procedures*

The peer review process should be consistent with that used by bodies such as the National Institutes of Health and the National Science Foundation. Primary and secondary levels of review should be employed when large numbers of proposals are received to ensure maximum consideration and optimal deliberation for decision making.

#### **Military-Civilian Interactions**

The committee recognizes the unique military perspectives, experiences, and resources afforded by DoD intramural research programs. To add breadth and depth and expand dissemination, the committee recommends that DoD intramural efforts increase the formation of strong collaborative partnerships with established academic institutions, federal agencies, or civilian research programs. Furthermore, the committee urges the Command to require that intramural as well as extramural DWHRP awardees document and share their research by submitting manuscripts for publication in scientific, peer-reviewed journals.

Strategies to promote information exchange that can lead to collaboration include jointly sponsoring workshops and seminars, preparing applicant information packets, encouraging civilian scientists to explore opportunities for collaboration by visiting military laboratories (perhaps in conjunction with a workshop or symposium), awarding small grants explicitly to promote collaboration with outside investigators and their access to military populations, publicizing information about the databases managed by the Defense Technical Information Center, providing easy access to the bibliographies and abstracts used in the preparation of this report, and continuing development of the military women's health information clearinghouse.

The committee further recommends continued development of databases for sharing epidemiologic and other health data across the three services and with other researchers.

The committee points out that military women themselves are a key source of information and insights of investigators, and they should be involved in identifying their health concerns and investigating the solutions.

### **RECOMMENDATION FOR LONG-TERM RESEARCH ON THE HEALTH OF MILITARY WOMEN**

Recognizing the historical underrepresentation of women in research projects that address the health and performance of service members, the committee recommends that DoD make a long-term commitment to research focused on the health of women in the military—including longitudinal study of military women and the design, development, and maintenance of databases needed to support this type of research. Among promising topics for longitudinal research are relationships between the aging process and physical skills required in the military; risk factors for osteoporosis and measures for its prevention; relationships among weight, physical activity, and joint disease; relationships between occupational exposures and cancer; and occupational stress in relation to cardiovascular disease or psychiatric sequelae such as post-traumatic stress disorder (PTSD). As part of this long-term research effort, the committee further recommends continued development of both general and gender-specific databases that allow sharing of epidemiologic and other health data across the three services and with other researchers.

Databases and the military women's health clearinghouse that are under development will require ongoing support to provide a return on investment. To ensure continuity and utilization of the valuable and unique information contained in comprehensive, large-scale databases on the health of military women, the committee recommends that the responsibility for their development and maintenance be assigned to single entities that would provide information to health facilities and clinicians in all the military services as well as to the research community.

An ongoing program would enable DoD to take action to correct problems in women's health and women's health care that are only beginning to be recognized. With the growing proportion of women in the Armed Forces, such action would support mission readiness, mobilization, and deployment, and would promote women's health throughout their military careers and beyond.

To assist the long-term effort, the committee recommends the formation of an ongoing Defense Women's Health Research advisory group. This should be an independent, nongovernmental group that comprises (1) civilian experts in disciplines related to the health of military women and the types of research needed and (2) two active duty servicewomen (with representatives from both enlisted and officer ranks) who are not connected with any military health research programs. With input from representatives of military laboratories at

scheduled meetings or workshops, this group could perform the following functions:

- monitor and review progress of DWHRP;
- advise about research areas needing increased attention;
- advise about ways to strengthen DWHRP;
- respond to proposed approaches for studying particular health problems of military women; and
- advise about the conduct of research or the interpretation of results from selected studies.

### RECOMMENDATIONS FOR RESEARCH AREAS

The committee's recommendations of specific topics of research fall into four broad areas:

1. major factors affecting the health or work performance of military women;
2. psychological and health issues resulting from integration of women into a hierarchical male environment, or related to women and men living and working together in close quarters;
3. health promotion and disease prevention; and
4. access to and delivery of health care.

The following sections elaborate on areas in which there are substantial gaps in knowledge. These areas are not intended to be all-inclusive. Breast cancer was not considered because of the separate and extensive DoD Breast Cancer Research Program.

#### **Major Factors Affecting the Health or Work Performance of Military Women**

*Gynecologic and Reproductive Health.* Considerable research has been conducted at military hospitals on topics related to pregnancy. Very little is being done to study the everyday aspects of the gynecologic or reproductive health of military women, especially in field conditions. Among important topics for study are the following:

- management of common gynecologic problems such as vaginitis,
- safe and feasible birth control methods in the field,



- strategies for coping with or suppressing menstruation while in a combat or field situation and their long- and short-term sequelae,
- early identification and effective treatment of sexually transmitted diseases,
- rapid and accurate pregnancy screening methods,
- the scientific basis for pregnancy and postpartum policies—e.g., policies concerning permissible occupations and activities, when to return to duty or begin special training, how long to allow for returning to weight and physical fitness that meet service standards, and lactation after return to duty. (See also the sections “Health Promotion and Disease Prevention” and “Access to and Delivery of Health Care.”)

*Nutrition.* Nutritional status can have significant effects on performance. Studies of female athletes show diminished capacity in women with low energy intakes and/or deficiencies of such nutrients as iron and calcium. Other studies have suggested that increased consumption of specific nutrients can improve performance. Several nutritional studies of military women are under way that focus on the identification and correction of nutritional problems adversely affecting performance and overall health. Examples of topics that need further study include:

- the nutritional status of military women, accounting for life-cycle stage, military status (i.e., basic training, active duty, reserve), and job category;
- the acceptability and actual consumption of field rations and fluids by women and factors that influence food intake in the field, such as extreme environmental conditions, menstrual status, and extreme physical activity; and
- nutrient and fluid requirements for optimal performance of specific categories of jobs, tasks, and military status, under both normal and extreme environmental conditions.

*Physical Fitness.* Considerable research has been completed or is in progress that investigates strategies to increase strength, fitness, and endurance as they are uniquely relevant to women’s military performance. Gaps were identified in the following areas:

- optimal physical fitness for military women, methods to achieve it efficiently, and methods to maintain physical fitness throughout military service;
- scientific basis for methods to assess fitness—to use as a basis for standards, including those for postpartum physical fitness;
- interaction of the menstrual cycle with physical training and fitness assessment;

- prevention of musculoskeletal injuries (e.g., stress fractures) related to military training and job specialties;
- safely maintaining physical fitness during pregnancy; and
- relationship of menopausal status to military physical fitness and performance.

*Adaptation to Environmental and Occupational Stressors.* The degree of adaptation to occupational and environmental extremes can have profound effects on performance. Some research has identified gender-specific differences in response to stressors, but continued research is required to develop methods to promote optimal performance by women exposed to occupational and environmental extremes. Because physical exertion and environmental stress interact under complex conditions in the military, both laboratory and field studies of women under meaningful military circumstances are needed in areas such as the following:

- women's physiological, psychological, and behavioral responses when exposed to operational stressors such as intense physical activity, extreme ambient environments (e.g., heat, cold, pollutants), fatigue, food restrictions, restrictive clothing, bulky or heavy equipment, or disturbances of biological rhythms;
- effects of various aspects of military life (e.g., intense, exhaustive exercise; psychological stress) on women's immune function, health-related factors that impair immune function, and external factors (e.g., nutrients, hydration, performance aids) that may afford protection from such impairment—for example, does the use of various types of contraceptive agents affect the response to stress?
- short- and long-term safety and efficacy of specific strategies for enhancing performance under stress;
- potential gender-specific effects of infectious diseases encountered primarily outside the United States (such as visceral leishmaniasis); and
- methodologies for rapid diagnosis and safe and effective treatment of unusual diseases with special emphasis on gender, pregnancy, and ethnic background.

*Protective Clothing and Equipment.* Few of the many studies of the development and performance of protective clothing include women at all, and almost none explore any aspect of protective clothing and equipment for women in combat. Among the critical gaps that were identified are:

- the application of anthropometric data to new approaches to sizing and to the design of end products that fit a variety of body segment combinations and body contours;
- gender and racial or ethnic differences in thermal balance when wearing body cooling and heating systems employing different media and locations on the body;
- endurance in women of various body sizes and types when loads are mounted in different configurations on various body locations; and
- methods for dealing with urination, defecation, menstrual flow, and other sanitary needs in a variety of military environments.

*Drug Metabolism and Effects in Military Women.* Understanding the effects of gender, ethnic background, menstrual cycle, and the interaction of these on the absorption and metabolism of drugs and their pharmacologic and adverse effects is increasing but remains limited even in the civilian population. The further interactions of stress, physical activity, and dietary changes add additional uncertainties regarding the optimal dosage and use of drugs and precautions needed for prophylaxis or therapy in military women under field-like conditions. It would be especially valuable to address these uncertainties in studies of such drugs as oral contraceptives (alone and interacting with other drugs); drugs affecting immune function (e.g., oral and inhaled corticosteroids); drugs with central nervous system effects (e.g., antianxiety, antidepressant, analgesic, and antihistamine agents); antibiotics, antimalarials, and antifungal agents; and drugs for protection against and treatment of the effects of chemical and biological weapons.

*Psychological Stress.* Many emotional disorders of special relevance to women (e.g., depression) are being studied extensively in the civilian sector, and these studies should aid military women as well. Other disorders, such as PTSD, have been studied primarily in military men. Several disorders and areas of psychological research are especially important to military women who are in training or deployed. These include but are not limited to the following:

- combat stress reactions or PTSD following near death, loss of friends and colleagues, or viewing and participating in violence to the enemy;
- psychological effects (e.g., phobias) related to the use of protective clothing and equipment, and ways to ameliorate them;
- impact of family issues (e.g., repeated or long periods of separation from children resulting from deployment; lack of adequate or affordable child care; concerns about family well-being; problems meeting family needs related to low income) on servicewomen under conditions such as mobilization, deployment, training, or traumatic incidents;

- identification of factors (e.g., prior history of abuse, period of association with friends lost in combat, family issues) influencing the likelihood that trauma will result in PTSD;
- methods of preparing women for gender-specific aspects of captivity; and
- factors associated with low suicide rates in the military and their possible relevance to reducing other problems

#### **Psychological and Health Issues Resulting from Integration of Women into a Hierarchical Male Environment, or Related to Women and Men Living and Working Together in Close Quarters**

The relatively recent integration of women in the military calls for study of a number of health issues related to the close living and working conditions of men and women in the military. These issues include but are not limited to sexual harassment, physical abuse, and maintaining privacy and self-respect in close quarters. Although sexual harassment is the subject of a number of studies, additional research is needed concerning methods to eliminate the problem.

Examples of specific research problems include:

- the extent and impact of sex-role stereotyping of military women by military officers, noncommissioned officers, and enlisted personnel;
- the prevalence, contributing factors, and effects of physical and sexual assaults and sexual harassment of women in the Armed Forces;
- effects of premilitary sexual abuse or violence history and military traumatic experiences on psychological health and job performance;
- outcomes of treatment for traumatized servicewomen; and
- strategies for handling sanitary needs.

#### **Health Promotion and Disease Prevention**

Despite the large amount of civilian research in health promotion and disease prevention, the military situation presents opportunities and challenges that require study. For example, the high prevalence of sexually transmitted diseases (STDs) among military women (see chapter 1) points up the urgent need to study methodologies for rapid and accurate diagnosis, single-dose treatment and preventive measures, and to study the short- and long-term impacts of STDs on military women. In the population of military women, HIV infection is primarily a sexually transmitted disease because intravenous drug abuse is uncommon, and research should focus on its prevention.

Other examples of important health promotion or disease prevention research topics include the following:

- effectiveness of health education, fitness programs, weight control programs, smoking cessation programs, alcohol treatment programs, and other educational or social marketing strategies intended to promote the health of military women;
- outcomes of efforts to improve women's ability to make informed health care decisions and to use military health care services effectively;
- prevention of vaginitis, cystitis, urinary tract infections, sexually transmitted diseases, incontinence, bladder and pelvic prolapse, procidentia, cystocele, and rectocele;
- psychological, environmental, and geographical factors that contribute to job stress and job satisfaction, such as gender role or gender conflict in occupational settings, family and parenting responsibilities, lack of adequate and affordable child care, sexual discrimination or harassment, and shift work; and
- gender-specific aspects of injury avoidance.

Further analysis of data from annual Health Risk Appraisals and the Army-Wide HIV/AIDS Risk Survey, giving special attention to racial and ethnic background, would provide important guidance for interventions aimed at smoking, drinking, poor nutrition, and risky sexual behavior.

For the general population, substantial data exist regarding adverse health consequences of weight cycling and disordered eating. Given the requirement to meet prescribed weight standards, there is a need to examine such topics as:

- the prevalence of disordered eating and its relationship to the meeting of weight and fitness standards;
- the prevalence of weight cycling in military women and the health and performance consequences of this practice;
- the scientific basis for weight and body composition standards used for induction and continuation in service (e.g., postpartum body composition standards); and
- the prevalence of menstrual dysfunction and subsequent health concerns such as stress fractures and osteoporosis.

Considerable animal research has been conducted on hazards to which military personnel may be exposed, but there is continuing need for evaluation of the extent and possible impact on women of occupational exposure to potential toxins, carcinogens, teratogens, pesticides, blast, repetitive impact shock, and electromagnetic radiation over both the short and the long term. Examples of substances include munitions residues, radioactive aerosolized

depleted uranium, single materials and mixtures of air pollutants (petroleum vapors, diesel and gasoline mixtures) similar to Persian Gulf exposures, petroleum mixtures and diesel or leaded gasoline fuels (materials used by military personnel in the Persian Gulf for unvented heating and to suppress sand and dust), and smoke (both from fires and from smoke generators).

### **Access to and Delivery of Health Care**

Perhaps one of the most important areas for research is access to and delivery of women's health care. The committee found minimal research in this area, apart from prenatal and perinatal care. Health services research should be conducted to study the accessibility and availability of women's health services in field operations and ways that these might be improved (e.g., special training in gynecologic and reproductive health services, as noted in more detail later in this section).

One key to setting priorities for such research is obtaining input from military women about a wide range of health topics such as gender-related health concerns; coping mechanisms; sites where services are felt to be inadequate; and suggestions for health care related to training, specific job specialties, deployment, and combat operations. Which needs do women feel are currently being met, and which are not? What are their current health practices? What do they consider to be acceptable practices and interventions? What cultural differences should be considered in establishing standards and policies? Effective mechanisms are needed to collect such data from previously deployed women who are in the reserves as well as from active duty servicewomen.

The committee was concerned about reports that members of the military may fail to seek care for mental health problems for fear of adverse career impact. Topics for investigation include the following:

- effects of barriers to mental health care on mission performance;
- methods for reducing barriers to mental health care and the results of reducing them; and
- outcomes from alternative approaches to mental health care.

Other promising areas of women's health services research include the use and training of different types of health care providers in garrison and field, the expanded use of technology (including telemedicine), and comparisons of the health status of active duty and reserve women. Some of the many possible examples of studies related to health care services are listed below:

- *Comparison of a self-care program with usual medical care of women under training or field conditions:* What should gender-specific self-care packs contain (e.g., for prevention or treatment of dysmenorrhea, cystitis, vaginitis, skin irritation, heartburn, diarrhea, constipation, and respiratory infection)? How could maximum stability of those drug products be ensured in field conditions? How should self-care packs be packaged? What instructions would best promote safe and effective use of these packs?

- *Prevalence of the prescription and use of antibiotics, antianxiety drugs, and antidepressants and side effects related to their use:* How do these practices relate to work performance and the need for other health services?

- *Outcomes, including cost-effectiveness of training of general medical officers and of enlisted medical personnel to provide excellent gynecologic and reproductive health care:* How might short courses in breast examination, pelvic examination, colposcopy with appropriate biopsies, and the treatment of such conditions as cystitis, vaginitis, and dysmenorrhea increase the availability of appropriate gender-related care at remote sites? Would such courses increase the satisfaction of military women with their care? How would care provided by such specially trained personnel compare with that provided by those with usual training? Are there other ways to improve women's health care at remote sites?

- *Lack of access to pregnancy termination services* (prohibited by the FY 1979 Defense Appropriations Act): What effects does this have on women's health and retention in the military?

- *Potential effects of screening programs on women's health, evacuation numbers, and costs in recent deployments:* For example, would rapid, accurate premobilization and predeployment pregnancy testing of servicewomen have decreased problems?

### CONCLUDING REMARKS

The committee commends DoD and DWHRP for the initial steps taken to develop a strong research program on the health of military women. The committee's overarching recommendations provide guidance for setting priorities and developing a strong, well-targeted program. Recommendations for research areas relate to gaps found in the research base. For maximum return of investment, the committee recommends long-term commitment to women's health research, including longitudinal studies of military women and the design, development, and maintenance of databases necessary to support this type of research. Military service records should provide an excellent basis for long-term studies of the effects of racial or ethnic background, education, economic status, weight, body mass index, fitness, job specialization, high-risk

behaviors, and other factors on the development of gynecologic problems, hypertension, diabetes, heart disease, osteoporosis and fractures, joint disease and arthritis, mental status and Alzheimer's disease, a number of cancers, and other diseases of special concern to women. Research findings could be of direct benefit not only to DoD but to the entire nation.

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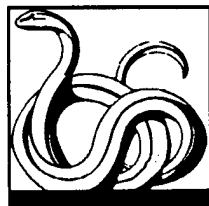
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1995



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Committee on Defense Women's Health Research

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The report to which this volume is an addendum, *Recommendations for Research on the Health of Military Women*, has been reviewed by a group other than the authors according to procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The current volume of bibliographies was not subject to report review.

The Institute of Medicine was chartered in 1970 by the National Academy of Sciences to enlist distinguished members of the appropriate professions in the examination of policy matters pertaining to the health of the public. In this, the Institute acts under both the Academy's 1863 congressional charter responsibility to be an adviser to the federal government and its own initiative in identifying issues of medical care, research, and education. Dr. Kenneth I. Shine is president of the Institute of Medicine.

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The serpent has been a symbol of long life, healing, and knowledge among almost all cultures and religions since the beginning of recorded history. The image adopted as a logotype by the Institute of Medicine is based on a relief carving from ancient Greece, now held by the Staatlichemuseen in Berlin.

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## Preface

This set of bibliographies was prepared to accompany the report *Recommendations for Research on the Health of Military Women* (Institute of Medicine, 1995).<sup>1</sup> That report is based on a study conducted by the Committee on Defense Women's Health Research of the Institute of Medicine on behalf of the U.S. Army Medical Research and Materiel Command (the Command), which manages the Defense Women's Health Research Program (DWHRP).

DWHRP was established in FY 1994 to support research aimed at addressing the health-related needs of military women. Congress provided \$40 million to the Department of Defense (DoD) in both FY 1994 and FY 1995, with the promise of additional funding in subsequent years, for intramural and extramural research relevant to the goals of the DWHRP. Those goals relate to mission readiness, deployment, and training.

The Command asked the Institute of Medicine for guidance on the use of appropriations for DWHRP. Particular attention was to be directed toward such topics as psychological stressors, physiological stressors, nutritional status, occupational safety issues, design of equipment and clothing, and special health care needs—all as related to servicewomen in training or deployment situations.

The Institute of Medicine appointed a 19-member committee (1) to identify gaps and strengths in past and current research relating to the health and performance of military women, and (2) to provide guidance on establishing research funding priorities. With guidance from the committee, the study staff conducted an extensive search of relevant studies from the published literature and from government reports of currently funded research. The committee reviewed the extensive bibliographies with available abstracts and used a deliberative process and collective expert opinion to develop its recommendations.

The broad scope of the searching resulted in retrieval of more than 5,700 citations of published works and 2,600 citations for current research. Citations that were obviously not relevant to the study were deleted by project staff. At the conclusion of the study, the database covering published works contained more than 2,100 references to relevant research on women's health, and the database covering current research contained more than 1,100 references. This volume lists those references.

Chapter 1 outlines the search terms and online databases used to locate relevant articles and studies. Chapter 2 is divided into two parts. Part A includes references to published literature from the civilian databases, and Part B includes references obtained through the Defense Technical Information Center's Defense Research, Development, Testing, and Evaluation Online System (DROLS). Chapter 3 is also divided into two parts. Part A provides a listing of relevant research in progress, excluding that funded by the Defense Women's Health

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<sup>1</sup>For ordering information about the report itself and about the published and electronic versions of this book of bibliographies, see the verso title page of this book.

Research Program. Part B covers the intramural research funded with FY 1994 appropriations by the Defense Women's Health Research Program.<sup>2</sup>

For both published and current research, citations were generally omitted if they covered health care problems that make servicewomen ineligible for deployment. Examples include chronic obstructive pulmonary disease, myocardial infarction, human immunodeficiency virus (HIV) infection, and diabetes mellitus. Many studies that dealt with the *prevention* of chronic diseases were included because of their relevance to the long-term health of military women.

It is hoped that potential investigators, current investigators, and Armed Forces practitioners will benefit from these bibliographies. Because of the large number of databases searched, these listings include studies that might be missed by routine searching and that might provide leads for other searches. The topical bibliographic listings provide a convenient starting point for a targeted, critical review of the literature. The topical listings of current research can stimulate communication among investigators with related interests. Review of the combination of published works and work in progress can suggest further aspects of research that have been ignored or require more attention. The electronic version of *Recommendations for Research on the Health of Military Women: Bibliographies* provides great flexibility in use of the references.

### Reference

Institute of Medicine. *Recommendations for Research on the Health of Military Women*. Washington, DC: National Academy Press; 1995. (To order an electronic or published copy, see the verso title page.)

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<sup>2</sup>Information about extramural research awards was not public when *Recommendations for Research on the Health of Military Women: Bibliographies* went to press.

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## Search Strategies

The following pages contain the search strategies used to retrieve citations related to the health of military women. Searches were conducted from March through May 1995. Search terms were truncated or proximity searched to maximize retrieval. When available, database hierarchical structures were utilized (e.g., MeSH tree structures) to retrieve subordinate terms. Databases were searched for publication years 1985–1995 unless otherwise noted.

The searches are organized by general subject area and bibliographic database. These pages also contain the numbers of citations retrieved (for most of the searches) using the specified search terms or combination of terms. Where the number of citations is missing, the search was so broad that the numbers would not be meaningful.

<u>Search Number</u>	<u>Terms</u>	<u>Number of Citations</u>
<b>Medline—Psychological Stress</b>		
s1	stress, psychological	13,166
s2	stress disorders, post-traumatic	1,928
s3	psychophysiologic disorders	4,204
s4	s1 or s2 or s3	18,609
s5	limit to female and human	8,064
s6	s5 not (aged or child or infant or adolescence)	4,132
s7	military personnel or police or emergency medical technicians or war or combat (non-MeSH) or women, working	10,900
s8	s6 and s7	160
s9	s4 and (sex characteristics or sex factors) not (aged or adolescence or child) and human	272
s10	s8 or s9	424
<b>NTIS—Psychological Stress</b>		
s1	stress, psychology	2,003
s2	psychophysiology and disorder	65
s3	post traumatic stress disorder	5
s4	s1 or s2 or s3 and (woman or female or combat or military personnel)	82

<u>Search Number</u>	<u>Terms</u>	<u>Number of Citations</u>
<b>Medline, PsycInfo, Social SciSearch, Sociological Abstracts—Psychological Issues</b>		
s1	depression or suicide	56,481
s2	substance abuse or alcohol or drug abuse or tobacco or eating disorders	47,965
s3	separation or isolation or combat or single parent or family issues	24,126
s4	violence or rape or sexual assault or sexual harassment or child abuse	23,761
s5	social support or cohesion or community resource or unit support	21,686
s6	job stress or training stress or readiness or retention	15,757
s7	job satisfaction or job readiness or deployment or cohesion	29,617
s8	military and (women or female)	808
s9	(s1 through s7) and s8	158
<b>ERIC—Psychosocial Issues</b>		
s1	military personnel or military training or military organizations	3,340
s2	family violence or traumatic stress	465
s3	depression or suicide or substance abuse or drug abuse	9,773
s4	retention or deployment	9,083
s5	separation or single parent	3,467
s6	s2 or s3 or s4 or s5	22,507
s7	s1 and s6	53
<b>PsychInfo—Psychologic and Physiologic Stress</b>		
s1	temperature effects or hypothermia or food deprivation or hunger or thirst or fatigue or water deprivation or dehydration or radiation or thresholds or vasoconstriction or altitude effects or acceleration or occupational stress or environmental stress or physiological stress	23,579
s2	psychological stress or post-traumatic stress disorder or psychophysiologic stress	6,290
s3	physical fitness or physical strength or physical endurance or exercise or motor processes or activity level or motor coordination or motor skills or physical agility or physical dexterity or running or muscle tone or perceptual motor processes	29,592
s4	sexual harassment or sexual abuse or gynecological disorders or urinary function disorders or dysmenorrhea or menstrual disorders or dermatitis	33,683
s5	s1 through s4 and human sex differences and language=English and adult not (aging or elderly not child)	118

<u>Search Number</u>	<u>Terms</u>	<u>Number of Citations</u>
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**Medline—Occupational Exposure**

s1	occupational exposure	5,411
s2	occupational health	4,760
s3	hazardous substances	786
s4	occupational diseases	25,579
s5	combined above terms	33,500
s6	s5 and military personnel	137
s7	s5 and sex characteristics	27
s8	s6 or s7	164

**Medline, Embase, NTIS—Organ Toxicity**

s1	neurotox	32,865
s2	reprotox	9,282
s3	immunotox	4,203
s4	hepatotox or nephrotox	23,927
s5	respiratory tox	34,029
s6	cardiovascular tox	31,194
s7	dermatotox	8,141
s8	s1 through s7 combined	129,606
s9	s8 not animal	74,056
s10	s9 and female	4,126
s11	s9 and gender differences or sex characteristics or sex factors	57
s12	s9 and military personnel	19
s13	s11 or s12	76

**Medline, Embase, NTIS, Toxline—Pollutants**

s1	organophosphates/adverse effects or oil fumes/adverse effects	268
s2	pollutants or air pollution/adverse effects	4,795
s3	s1 or s2	5,046
s4	s3 and military personnel	16
s5	s3 and gender differences or sex characteristics or sex factors not (aged or child or adolescent or elderly) not (editorial or letter or news or case report)	49
s6	s4 or s5	64

**Medline, Embase, NTIS—Infectious Agents and Biologicals**

s1	viruses	69,124
s2	bacteria	102,360
s3	protozoa or fungi	94,807
s4	infectious agents or biologicals	2,652
s5	s1 through s4 combined	250,024
s6	s5 and military personnel	325
s7	s6 not (news or letter or editorial or case report) not (child or adolescent or elderly or aged)	259
s8	s7 and female	3

<u>Search Number</u>	<u>Terms</u>	<u>Number of Citations</u>
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**Occupational Safety and Health—Occupational Exposure**

s1	occupational exposure or environmental exposure or pesticides	20,619
s2	s1 or insecticides or pollutants or thermoregulation	23,193
s3	s2 or dermatologic or radiation exposure or electromagnetic fields or hyperbaric	38,408
s4	s3 or hearing impairment or noise or toxic or toxin or hypoxia	43,069
s5	s4 and sex factors and human or workers	85

**SpaceLine—Occupational Exposure, Physiological Stressors**

s1	(ionizing radiation or electromagnetic fields or acceleration or anti-G suits or G forces or hypoxia or anoxia or altitude or pressure or hyperbaria) and (physiological responses or health) and human	N/A <sup>1</sup>
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**Medline, Embase, NTIS, Toxline—Radiation or Biomechanics or Hyperbaric**

s1	biomechanics	21,783
s2	hyperbaric	5,318
s3	electromagnetic fields/adverse effects	473
s4	radiation injuries or radiation/adverse effects	11,705
s5	pesticides/adverse effects or insecticides/adverse effects	3,314
s6	s1 through s5 combined	48,981
s7	s6 and female or woman or women	11,955
s8	s7 limited to human	9,352
s9	s8 and (gender differences or sex characteristics or sex factors or military personnel)	224
s10	s9 not (child or elderly or aged or adolescent) not (news or letter or editorial or case report)	92

**Medline, Embase, NTIS—Sunlight, UV, Dark Adaptation**

s1	dark adaptation or dark and health	3,309
s2	ultraviolet light and (adverse effects or health or disease)	544
s3	sunlight or lack of sun	5,564
s4	laser and (adverse effects or health or disease) not (therapy or surgery)	13,281
s5	luminescence and (adverse effects or health or disease)	1,338
s6	s1 or s2 or s3 or s4 or s5	23,863
s7	s6 not (cancer or neoplasm or vitamin D or animal)	17,077
s8	s7 and military personnel	65
s9	s8 and female	0
s10	s6 and (performance or stress)	969
s11	s10 and female	136
s12	s8 or s11 not (elderly or adolescent or child or children or infant or editorial or news or case report or letter)	98

<sup>1</sup>N/A=Not Available

<u>Search Number</u>	<u>Terms</u>	<u>Number of Citations</u>
<b>Medline—Clothing and Equipment Design</b>		
s1	protective devices	6,540
s2	clothing	3,966
s3	protective clothing	2,014
s4	equipment design	14,278
s5	s1 through s4 and military personnel	141
<b>Medline, Embase, NTIS—Equipment Design</b>		
s1	equipment design	16,036
s2	s1 and military personnel	39
s3	s1 and gender	24
s4	backpack design and gender	9
s5	s2 or s3 or s4 not (elderly or adolescent or child or aging or children or infant or editorial or news or letter or case report)	53
<b>Textile Technology Digest (1991–1995)—Protective Clothing</b>		
s1	protective clothing	2,374
s2	performance	5,339
s3	thermal properties	2,080
s4	physiological effects	957
s5	s1 through s4 and military uses or gender or female not elderly or child or adolescent	116
<b>Medline, Embase, NTIS—Anthropometry or Weight-Bearing</b>		
s1	anthropometry	19,505
s2	weight bearing or load bearing and capacity	207
s3	s1 or s2 and (sex characteristics or sex factors or gender differences or military personnel) not (news or letter or editorial or case report) not (child or elderly or aged or adolescent) and female or woman or women	60

<u>Search Number</u>	<u>Terms</u>	<u>Number of Citations</u>
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**Medline—Adverse Effects of Pharmaceuticals**

s1	biological products	66,794
s2	anthelmintics	11,652
s3	antidiarrheals	52,620
s4	anti-inflammatory agents	79,261
s5	antidotes	5,015
s6	antibiotics	110,477
s7	contraceptive agents	18,551
s8	anesthetics	39,473
s9	bronchodilator agents	36,548
s10	antihypertensive agents	52,376
s11	motion sickness/drug therapy	490
s12	s1 through s11 and adverse effects	54,052
s13	s12 and military personnel	49
s14	s12 and sex characteristics	37
s15	s13 or s14	85

**Medline, Embase, NTIS—Adverse Effects of Pharmaceuticals**

s1	contraceptives or analgesics or antihistamines	83,452
s2	estrogen replacement therapy or hormone replacement therapy	3,794
s3	altitude sickness and drug therapy	267
s4	vaccines or vaccination	62,578
s5	diet and drug therapy	9,614
s6	s1 through s5 combined and efficacy or efficacious	33,488
s7	pharmacokinetics	218,235
s8	pharmacodynamics	5,951
s9	drug metabolism	43,018
s10	s7 or s8 or s9 and (gender differences or sex characteristics)	308
s11	s6 or s10	33,793
s12	s11 and female	9,358
s13	s12 not (child or adolescent or elderly or infant) not (letter or news or editorial or case report)	5,543
s14	s13 and (stress or exercise or smoking or alcohol or ethanol or military personnel)	170

**Medline—Musculoskeletal Injuries and Prevention**

s1	athletic injuries/prevention	698
s2	fractures/prevention	1,165
s3	stress fractures/prevention	12
s4	sprains and strains/prevention	161
s5	musculoskeletal system/injuries/prevention	685
s6	s1 through s5 combined and [military personnel or sex characteristics or sex factors (limit to not aged, aging, infant, child, adolescence)] and human	26
s7	s1 or s2 or s3 or s4 or s5 and military personnel	250
s8	s6 or s7	256

<u>Search Number</u>	<u>Terms</u>	<u>Number of Citations</u>
<b>Medline—Strength and Fitness</b>		
s1	physical fitness	3,089
s2	muscle contraction	26,385
s3	muscles/physiology	123,534
s4	exercise/physiology	3,972
s5	psychomotor performance	11,355
s6	bone density	4,190
s7	arm/physiology	677
s8	pectoralis muscles	546
s9	upper body strength	29
s10	combine all of the above terms	152,436
s11	combine with sex characteristics or sex factors limit to human not (aged, aging, infant, child, adolescence, amputation)	335
<b>NTIS—Strength</b>		
s1	performance, human or muscle contraction	11,354
s2	s1 or muscle or physiology	12,198
s3	s2 or exercise or physiology	13,472
s4	s3 or psychomotor or bone density	13,918
s5	s4 or physical fitness	14,567
s6	s5 and sex	16
<b>Sport Database—Stressors or Physical Fitness or Health</b>		
s1	stress fractures	416
s2	upper body strength or muscle strength	60
s3	cold or body temperature regulation or aerobic capacity or fatigue or exertion or hunger or thirst or sleep deprivation or stressors	8,747
s4	s3 and sex factor and comparative study	72
s5	nutrition assessment or nutrition status or eating disorders or caloric intake	499
s6	clothing and (sex factor or gender)	13
s7	body fat and (performance or risk factors)	165
s8	(s1 or s2 or s5 or s6 or s7) and (military personnel or sex factor)	177
s9	s8 or s3 not (elderly or child or adolescence) and language=English	106

<u>Search Number</u>	<u>Terms</u>	<u>Number of Citations</u>
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**Medline, Embase, NTIS—Physical Fitness**

s1	resistance training or weight training or weight lifting	2,081
s2	contraceptives, oral or contraception	23,541
s3	s2 and (aerobic or strength)	106
s4	estrogen replacement therapy	2,653
s5	s4 and (aerobic or strength)	25
s6	postpartum and (fitness or strength or exercise or in shape)	141
s7	s1 or s3 or s5 or s6	2,343
s8	s7 and female	865
s9	s8 not (elderly or adolescent or child or aging) not (letter or case report or news or editorial) not animal	380
s10	s9 and (athlete or athletes or military personnel)	47

**Medline—Nutrition**

s1	nutrition assessment	2,579
s2	nutritional status	4,014
s3	nutritional requirements	3,500
s4	caloric intake	6,741
s5	eating disorders	5,598
s6	s1 through s5 and (military personnel or female athletes or sex characteristics or sex factors) not (aged or aging or infant or child or adolescence) limit to human	274

**Medline, Embase, NTIS—Nutrition**

s1	vitamins or antioxidants	101,503
s2	substrate utilization or glucose utilization or free fatty acids	11,914
s3	nutritional supplements	729
s4	calcium or iron	223,950
s5	s1 or s2 or s3 or s4	323,172
s6	s5 not animal	173,229
s7	s6 and (athlete or military personnel)	459
s8	s7 and female	193
s9	s8 not (elderly or adolescent or child) not (letter or case report or editorial or news)	112

**Agricola—Nutrition**

s1	nutrition assessment or nutritional requirements	670
s2	nutritional assessment or eating disorders	1,381
s3	caloric intake or nutrient intake	4,579
s4	nutritional status	656
s5	s1 or s2 or s3 or s4 and (military personnel or athlete or sex differences) not (animal or child or elderly or adolescent)	46



<u>Search Number</u>	<u>Terms</u>	<u>Number of Citations</u>
<b>Medline—Operational Stressors</b>		
s1	heat/adverse effects	1,231
s2	cold/adverse effects	844
s3	hypothermia	3,481
s4	humidity	1,564
s5	food deprivation	1,694
s6	hunger	606
s7	water deprivation	668
s8	thirst	496
s9	fatigue	2,859
s10	body temperature regulation	6,708
s11	sleep deprivation	960
s12	noise, occupational	681
s13	hearing loss, noise-induced	1,119
s14	radiation, ionizing	849
s15	sensory thresholds	9,533
s16	water electrolyte imbalance	896
s17	vasoconstriction	6,846
s18	altitude	2,223
s19	work capacity evaluation	1,506
s20	heat exhaustion	477
s21	exertion	24,663
s22	acceleration	849
s23	stress (not psychological)	7,977
s24	combines all of the above searches	64,349
s25	s24 and sex characteristics or sex factors limited to human, not (aged or child or adolescence or infant)	510
<b>NTIS—Physiological Stress</b>		
s1	heat or heat exhaustion or cold or hypothermia or exertion	96,297
s2	s1 or humidity or food deprivation or hunger or water deprivation	102,756
s3	s2 or noise or hearing loss or acceleration or threshold	153,133
s4	s3 or vasoconstriction or stress or radiation or altitude	290,401
s5	s4 or thirst or fatigue or sleep deprivation or body temperature	115,722
s6	s5 and women or females and sex	42
<b>Medline, Embase, NTIS—Circadian Rhythm and Jet Lag</b>		
s1	circadian rhythm or jet lag	24,730
s2	s1 not animal not sleep deprivation	14,550
s3	s2 and female	6,664
s4	s3 and (military personnel or athlete) not (elderly or child or adolescent or fetal) not (letter or case report or editorial or news)	110

<u>Search Number</u>	<u>Terms</u>	<u>Number of Citations</u>
<b>Medline, Embase, NTIS—Physiology</b>		
s1	reaction time or motor skills	24,428
s2	female triad or athlete triad	19
s3	immune function or renal function or kidney function	41,387
s4	gastrointestinal absorption	1,515
s5	s1 or s2 or s3 or s4	67,304
s6	s5 and (athlete or military personnel)	227
s7	s6 and female	71
s8	s7 not animal not (elderly or child or adolescent) not (editorial or news or case report or letter)	44
<b>Medline—Body Fat Assessment and Body Fat Risk Factors</b>		
s1	body weight	32,128
s2	adipose tissue	11,927
s3	body mass index	3,367
s4	skinfold thickness	1,439
s5	obesity	12,598
s6	s1 through s5 combined	54,132
s7	s6 and military personnel	79
s8	s6 and risk factors	2,574
s9	s8 and female not (surgery or aged or aging or infant or child or adolescence) and exercise or exertion or work or performance	101
s10	s7 or s9	178
<b>NTIS—Body Fat</b>		
s1	body composition or body constitution or waist hip ratio	44
s2	body mass or skinfold thickness or body weight or adipose tissue	1,692
s3	risk factors	146
s4	s1 or s2 or s3 and sex	29
<b>Medline, Embase, NTIS—Body Fat Assessment</b>		
s1	body composition	25,676
s2	body fat or fat distribution	7,186
s3	densitometry	8,799
s4	body weight standards	79
s5	s1 or s2 or s3 or s4	38,697
s6	s5 not (adipose or body weight)	30,501
s7	obesity and drugs/adverse effects	459
s8	s6 or s7	30,951
s9	s8 not animal	21,415
s10	s9 and female	5,626
s11	s10 not (elderly or adolescent or child or infant) and athlete or military personnel	157
s12	s11 not (case report or news or letter or editorial)	133

<u>Search Number</u>	<u>Terms</u>	<u>Number of Citations</u>
<b>Medline, Embase, NTIS—Military Women and Athletes and Reproductive Health</b>		
s1	menstrual cycle or menstruation	18,877
s2	menstruation disorders	4,616
s3	contraceptive agents, female or contraceptive devices, female or birth control	10,976
s4	fetus or fetal	95,430
s5	postpartum or puerperium	11,865
s6	lactation or breast feeding	28,319
s7	lactation disorders	1,143
s8	infertility, female	4,850
s9	s1 through s8 combined	177,283
s10	s9 and military women (not news or letters or editorials)	25
s11	s9 and female athletes (not news or letters or editorials)	255
<b>Medline—Pregnancy and Infants</b>		
s1	pregnancy complications	62,969
s2	pregnancy	135,335
s3	infant, newborn	101,254
s4	infant, newborn, diseases	26,659
s5	fertility and female	3,376
s6	combined above terms and military personnel	87
s7	combined s1 or s2 or s5 and female athletes	17
s8	combined s6 or s7	104
<b>NTIS—Pregnancy</b>		
s1	pregnancy or fertility or postpartum or infant	7,778
s2	s1 and military personnel	37
<b>Medline, Embase, NTIS—Urogenital Diseases</b>		
s1	sexually transmitted diseases	53,994
s2	vaginitis	3,659
s3	urinary tract infections	7,946
s4	cystitis or urinary incontinence	8,261
s5	urogenital diseases	76,978
s6	s1 through s5 combined	164,115
s7	s6 and military women (not news articles or letters or case reports or editorials)	88

<u>Search Number</u>	<u>Terms</u>	<u>Number of Citations</u>
<b>Medline, Embase, NTIS—Military Women and Other Body Systems</b>		
s1	blood pressure or cardiovascular diseases	442,917
s2	cholesterol or headache	97,789
s3	breast diseases or mammograms	43,060
s4	lung diseases or respiratory diseases	143,786
s5	immune complex diseases	3,474
s6	dermatitis	27,464
s7	hearing disorders or hearing loss or deafness or inner ear or auditory loss	26,032
s8	vision disorders or blindness	14,939
s9	neuromuscular diseases	13,818
s10	s1 through s9 combined	765,884
s11	s10 and military women not (news article or letter or editorial or case report) not (child or elderly or adolescent)	67
<b>Medline, Embase, NTIS—Military Women and Other Body Systems</b>		
s1	musculoskeletal diseases	156,248
s2	digestive system diseases	255,803
s3	otorhinolaryngologic diseases	50,092
s4	eye diseases	80,459
s5	skin diseases not dermatitis	90,706
s6	s1 through s5 and military women not (news article or letter or editorial or case report) not (child or elderly or adolescent)	73
<b>Medline, Embase, NTIS—Other Health Conditions</b>		
s1	bladder prolapse or pelvic prolapse	68
s2	prolapsed or cystocele or rectocele	467
s3	personal hygiene	822
s4	s1 or s2 or s3 or s4 and (female and human)	652
s5	s4 and military personnel	0
<b>Medline, Embase, NTIS—Rheumatology and Arthritis</b>		
s1	rheumatology or arthritis or bursitis	86,400
s2	s1 and military personnel	47
s3	s1 and female athletes	55
s4	s1 and gender differences or sex characteristics or sex factors	600
s5	s2 or s3 not (animal or elderly or adolescent or child or children or infant or news or letter or case report or editorial)	43

<u>Search Number</u>	<u>Terms</u>	<u>Number of Citations</u>
<b>Medline, Embase, NTIS—Military Women and Health Care Services</b>		
s1	telemedicine	130
s2	health status	18,721
s3	delivery of health care	93,298
s4	health care services	10,403
s5	s1 through s4 combined	122,729
s6	s5 and military women not (news or letter) not (child or elderly or adolescent)	15
<b>ERIC—Military Personnel and Health or Health Care Services</b>		
s1	military personnel or military training or military organizations	3,340
s2	health needs or pregnancy or health services	4,919
s3	gynecology or medical services or health conditions	4,197
s4	s2 or s3	8,348
s5	s1 and s4	35
<b>Health Services/Technology Assessment Research (HStar)</b>		
s1	military not in Medline	819
s2	s1 and (women or training or health or health care or telemedicine or reserves or nutrition or readiness or performance or discharge or mission or supplies field or barrier or access)	364
<b>Dissertation Abstracts—Military Women</b>		
s1	military personnel or soldiers	967
s2	female or woman or women	58,227
s3	s1 and s2	132
s4	s3 not (historical or World War I or World War II)	65
<b>NTIS—Women and Military</b>		
s1	combat or military personnel	11,057
s2	s1 and women or females	139
<b>Defense Technical Information Center Databases—Work Unit and Technical Report</b>		
s1	(pesticides or aromatic hydrocarbons or organophosphates or fumes or pollutants or pollution or toxemia or neurotoxins or toxins or antitoxins) and (females or women)	N/A
s2	(stress fractures or bone fractures or protective clothing or protective equipment or anthropometry or ionizing radiation or electromagnetic radiation or altitude or hypoxia or hyperbaric conditions or low pressure or altitude sickness or noise or deafness or infectious diseases or biomechanics or clothing or bearing capacity) and women	

<u>Search Number</u>	<u>Terms</u>	<u>Number of Citations</u>
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#### Defense Technical Information Center Databases—Work Unit and Technical Report

s3	(estrous cycle or birth control or contraception or vaginitis or cystitis or urinary tract infection or incontinence or venereal diseases or gonorrhea or chlamydia or pregnancy or lactation or breast feeding or postpartum or immune disorders or cardiovascular diseases or respiratory diseases or skin diseases or gastrointestinal diseases or otorhinolaryngology or eating disorder or bulimia or anorexia or health care or health problem or health status or infectious disease or communicable diseases or mammary glands or orthopedic condition or injury or infertility or fertility or health service) and women	
s4	(physiology or nutrients or nutrient requirements or nutrition status or nutritional status or athlete or operational stressors or tolerance or aerobic fitness or anaerobic fitness or pharmaceutical or biologicals or pollutants or toxicant or prescription drug or amenorrhea or stress fracture or diet or vitamins or antioxidants or calcium or iron or substrate utilization resistance training or physical fitness or strength or body weight or lipids or adipose tissue or endurance or reproduction or strength weight ratio or circadian rhythms or sleep deprivation or food deprivation or jet lag or exertion or hunger or thirst or water deprivation or thresholds or hormone replacement or analgesics or pharmacokinetics or pharmacodynamics or contraception or antihistamines or antiinflammatory agents or antidotes or stress or female athletic triad or reaction time) and women	
s5	(depression or suicide or substance abuse or drug abuse or phobia or chemical warfare or biological warfare or protective clothing or posttraumatic stress disorder or PTSD or traumatic shock or stress or family or parent or isolation or rape or sexual assault or domestic violence or sexual harassment or child abuse or job stress or occupational readiness or personnel retention or training stress or job satisfaction or unit cohesion or sexual behavior) and women	

#### Federal Research in Progress

s1	women or females	7,377
s2	s1 not (elderly or aging or child or adolescent)	5,433
s3	s2 not animal	4,806
s4	depression or suicide	2,457
s5	s3 and s4	180
s6	traumatic stress or combat stress or PTSD	409
s7	s6 and s3	46
s8	substance abuse or drug abuse	1,886
s9	s8 and s3	178
s10	phobia and chemical or biological warfare	0
s11	family separation or role conflict or isolation or single parent	3,286
s12	s11 and s3	96

<u>Search Number</u>	<u>Terms</u>	<u>Number of Citations</u>
<b>Federal Research in Progress</b>		
s13	rape or sexual assault or domestic violence or sexual harassment or child abuse	172
s14	s13 and s3	24
s15	job stress or training stress	18
s16	s15 and s3	0
s17	job satisfaction or sexual behavior or social support	1,058
s18	s17 and s3	143
s19	s5 or s7 or s9 or s12 or s14 or s18	546
s20	menstruation or menstrual or birth control or contraception	631
s21	s20 and s3	297
s22	vaginitis or cystitis or urinary tract infection	204
s23	s22 and s3	24
s24	incontinence or bladder prolapse	165
s25	s24 and s3	12
s26	sexually transmitted diseases or STD or gonorrhea or syphilis or chlamydia	83
s27	s26 and s3	98
s28	pregnancy or pregnant or breast feeding or postpartum or lactation	2,482
s29	s28 and s3	506
s30	personal hygiene and s3	1
s31	immune or cardiovascular or breast or pulmonary or respiratory not (cancer or neoplasm) not treatment	8,258
s32	s31 and s3	316
s33	cutaneous or neurosensory or gastrointestinal or otolaryngologic not treatment	1,781
s34	s33 and s3	42
s35	eating disorder or anorexia or bulimia	214
s36	s36 and s3	54
s37	health care services or health care delivery or access and health	1,036
s38	s35 and s3	116
s39	communicable diseases or infectious diseases or malaria or HIV or AIDS or hepatitis not treatment	5,203
s40	s37 and s3	233
s41	pelvic prolapse or procidentia or cystocele or rectocele or orthopedic or ophthalmologic	151
s42	s39 and s3	5
s43	s21 or s23 or s25 or s27 or s29 or s30 or s32 or s34 or s36 or s38 or s40 or s42	1,336
s44	stress fracture or musculoskeletal injuries	13
s45	s40 and s3	0
s46	protective clothing or protective equipment	48
s47	s42 and s3	0
s48	occupational injury or occupational exposure	177
s49	s44 and s3	17

<u>Search Number</u>	<u>Terms</u>	<u>Number of Citations</u>
<b>Federal Research in Progress</b>		
s50	fracture and s3	64
s51	anthropometry	201
s52	s47 and s3	20
s53	pesticides or insecticides or aromatic hydrocarbons or organophosphates or oil fumes	2,337
s54	s49 and (health or disease)	549
s55	s50 and s3	22
s56	pollutants and (health or disease)	152
s57	s52 and s3	5
s58	reproductive toxicity or nephrotoxicity or hepatotoxicity or immunotoxicity or respiratory toxicity or cardiovascular toxicity or dermatotoxicity	302
s59	s54 and s3	19
s60	radiation and (health or disease)	1,612
s61	s56 and s3	97
s62	hyperbaric or hypobaric or altitude or hypoxia or diving and (health or disease)	574
s63	s58 and s3	11
s64	hearing impairment or noise and health	54
s65	s60 and s3	0
s66	virus or bacteria or protozoa or fungus or fungi or infectious agent or biologicals	12,413
s67	s62 and (health or disease)	6,031
s68	s63 and s3	165
s69	biomechanics and s3	13
s70	fatigue and (sleep or muscle)	157
s71	s66 and s3	11
s72	s44 or s46 or s48 or s49 or s51 or s54 or s56 or s58 or s60 or s62 or s64 or s67 or s68 or s70	417
s73	nutrition or nutritional or caloric intake or vitamin or antioxidant	6,274
s74	s69 and (performance or activity or stress or exercise)	2,567
s75	s70 and s3	168
s76	(calcium or iron) and (nutrient or nutrition)	685
s77	substrate utilization	57
s78	(s72 or s73) and s3	58
s79	resistance training or weight training or postpartum fitness or muscle strength or physical strength	274
s80	s75 and s3	14
s81	body composition or body fat or densitometry or weight standards or adipose	1,245
s82	s77 and s3	130
s83	obesity and (assessment or performance)	77
s84	s79 and s3	11
s85	circadian rhythm or sleep deprivation or jet lag or exertion or hunger or food deprivation	711
s86	s81 and s3	67



<u>Search Number</u>	<u>Terms</u>	<u>Number of Citations</u>
<b>Federal Research in Progress</b>		
s87	thirst or water deprivation or sensory thresholds	107
s88	s83 and s3	5
s89	hormone replacement therapy or analgesics or pharmacokinetics or drug metabolism	2,819
s90	s85 and s3	136
s91	antidiarrheals or antibiotics or anthelmintics	1,949
s92	s87 and s3	68
s93	anti-inflammatory agents or antidotes	214
s94	s89 and s3	8
s95	estrogen replacement therapy	65
s96	s91 and s3	36
s97	female triad or athletic triad or athlete triad	0
s98	pharmaceuticals not (cancer or neoplasm) and s3	27
s99	heat or cold or noise or acceleration or toxicants or pollutants	10,434
s100	s98 and (stress or exercise or performance) and s3	21
s101	osteoporosis and (stress or exercise or performance) and s3	10
s102	s74 or s77 or s79 or s81 or s83 or s85 or s87 or s89 or s91 or s93 or s95 or s97 or s99 or s100	641
s103	s19 or s43 or s71 or s101	2,232
<b>CRIS/USDA—Nutrition Research in Progress</b>		
s1	women or woman or female or females	2,093
s2	s1 limited to the human nutrition subfile	558
s3	s1 not (elderly or aged or adolescent or child or children or infant)	244

## Publications

This chapter lists the published scientific literature located through the online database searching described in Chapter 1 of this book and in *Recommendations for Research on the Health of Military Women*. This chapter is divided into two parts. Part A lists the citations retrieved in searches of Medline, EMBASE, PsycInfo, Agricola, NTIS, ERIC, Dissertation Abstracts, Occupational Safety and Health, Sociological Abstracts, SpaceLine, HStar, Social SciSearch, Sport, Textile Technology Digest, and Toxline. Part B lists the citations retrieved in searches of the Technical Reports database of the Defense Technical Information Center (DTIC). Since many of the Technical Reports citations are also found in the NTIS database, duplicates are listed only once, in Part B. Animal studies were retrieved only for studies in the Technical Reports database on military-related toxins. For foreign language articles, the language is given in brackets at the end of the citation.

The indexing terms listed below were used to assist the committee and the reader in organizing the large volume of literature. Some citations have been placed in more than one category.

**Index Terms**

anthropometry  
body composition  
body composition, obesity  
bone  
cardiovascular health  
chemical defense  
communicable diseases  
cutaneous/dermal conditions  
database  
eating disorders  
endocrine  
family issues  
gastrointestinal conditions  
gynecologic/genito-urinary  
gynecologic/reproductive health,  
    birth control  
gynecologic/reproductive health,  
    lactation  
gynecologic/reproductive health,  
    long-range implications  
gynecologic/reproductive health,  
    postpartum  
gynecologic/reproductive health,  
    pregnancy  
health, general  
health services  
HIV/AIDS  
job satisfaction  
job stress  
load-bearing  
medical technology  
menstrual cycle  
military women, general  
musculoskeletal, biomechanics  
musculoskeletal, injuries  
musculoskeletal, treatment  
neurosensory conditions  
noise, hearing loss  
nutrition  
nutrition and exercise  
otolaryngological conditions  
performance  
pharmaceutical  
physical fitness, general  
physical fitness, strength/endurance  
protective clothing and equipment  
psychological conditions  
radiation  
respiratory conditions  
responses to stressors, other  
responses to stressors, physical activity  
responses to stressors, pressure  
responses to stressors, temperature  
sexual assault/harassment  
social support  
STDs  
substance abuse  
toxins  
traumatic stress, combat  
traumatic stress, other

## Part A

### Citations from Civilian Databases

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## **Research in Progress**

This chapter lists information on federally funded research currently in progress. It is divided into two parts. Part 1 lists the information retrieved by searching several online databases (Federal Research in Progress, CRIS/USDA, and the DTIC Work Unit) and through information received from federal agencies, including the Agency for Health Care Policy and Research, Centers for Disease Control and Prevention (CDC), Environmental Protection Agency, and the Maternal Child Health Bureau. The year of the award is included if it was available. Part B lists the intramural projects funded by the Defense Women's Health Research Program for FY 1994. Dollar amounts are reported for all studies for which they were available. These citations have been indexed as in chapter 2 with the terms on the following page. Some studies have been placed in more than one category.

**Index Terms**

body composition  
body composition, obesity  
bone  
cardiovascular health  
communicable diseases  
cutaneous/dermal conditions  
database  
eating disorders  
endocrine  
family issues  
gastrointestinal conditions  
gynecologic/genito-urinary  
gynecologic/reproductive health,  
    birth control  
gynecologic/reproductive health,  
    lactation  
gynecologic/reproductive health,  
    long-range implications  
gynecologic/reproductive health,  
    postpartum  
gynecologic/reproductive health,  
    pregnancy  
health, general  
health services  
HIV/AIDS  
hormone replacement therapy  
job satisfaction  
job stress  
load-bearing  
medical technology  
menstrual cycle  
miscellaneous  
musculoskeletal, biomechanics  
musculoskeletal, injuries  
musculoskeletal, treatment  
neurosensory conditions  
noise, hearing loss  
nutrition  
nutrition and exercise  
otolaryngological conditions  
performance  
pharmaceutical  
physical fitness, general  
physical fitness, strength/endurance  
protective clothing and equipment  
psychological conditions  
radiation  
respiratory conditions  
responses to stressors, other  
responses to stressors, physical activity  
responses to stressors, pressure  
responses to stressors, temperature  
sexual assault/harassment  
social support  
STDs  
substance abuse  
toxins  
traumatic stress, combat  
traumatic stress, other

## Part A

### Current Research

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- Greenblatt RM (University of California, San Francisco, CA). 1994. Bay Area women's HIV study. National Institute of Allergy and Infectious Diseases. \$2,103,267.
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- Marx PA (University of Alabama, Birmingham, AL). 1994. Mucosal and systemic immunity to SIV and HIV antigens. National Institute of Allergy and Infectious Diseases.
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- Cannon RO (National Heart, Lung and Blood Institute, Bethesda, MD). 1994. Effect of 17 beta-estradiol on coronary vascular hemodynamics in postmenopause. National Heart, Lung and Blood Institute.
- Cannon RO (National Heart, Lung and Blood Institute, Bethesda, MD). 1994. Estradiol and oxidizability of low density lipoprotein in postmenopausal women. National Heart, Lung and Blood Institute.
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- Eggena P (Department of Veterans Affairs, Medical Center, Sepulveda, CA). Postmenopausal Estrogen/Progestin Interventions. Department of Veterans Affairs, Research and Development.
- Howard JL (University of California Los Angeles, Los Angeles, CA). 1994. Postmenopausal Estrogen/Progestin Interventions Trial. National Center for Research Resources.
- Jayo MJ (Wake Forest University, Winston-Salem, NC). 1994. Thiazide effects on bone and arteries. National Institute of Arthritis and Musculoskeletal and Skin Diseases. \$346,063.
- Judd HL (University of California, Los Angeles, CA). 1994. Postmenopausal Estrogen-Progestin Intervention. National Heart, Lung and Blood Institute. \$21,955.
- Leboff MS (Brigham and Women's Hospital, Boston, MA). 1994. Effects of postmenopausal estrogen/provera hormone replacement. National Center for Research Resources.
- Miller VT (George Washington University, Washington, DC). 1992. Postmenopausal Estrogen/Progestin Intervention Trial. National Heart, Lung and Blood Institute.
- Newman WP (Department of Veterans Affairs, Medical Center). Evaluation of symptoms caused by various climacteric hormonal replacement protocols versus no therapy. Department of Veterans Affairs, Research and Development.
- Nuwayser ES (Biotek, Inc., Woburn, MA). 1994. Estrogen-progestin patch for estrogen replacement. National Institute of Child Health and Human Development. \$257,910.
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- Riggs BL (Mayo Foundation, Rochester, MN). 1994. Relationship of the renal leak in postmenopausal women to parathyroid hormone. National Center for Research Resources.
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- Subbiah MT (University of Cincinnati, Cincinnati, OH). 1994. Antioxidant potential of estrogens in menopause. National Heart, Lung and Blood Institute. \$153,770.
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Wood PD (Stanford University, Stanford, CA). 1992. Stanford postmenopausal hormone replacement study. National Heart, Lung and Blood Institute.

### JOB SATISFACTION

Glass JL (University of Notre Dame, Iowa City, IA). 91. Work conditions, pregnancy, and employment continuity. National Science Foundation. \$120,000.

### JOB STRESS

Marmot MG (University of London, London, England). 1994. Social and occupational influences on health and illness. National Heart, Lung and Blood Institute. \$114,958.

Williams RB (Duke University, Durham, NC). 1994. Biobehavioral correlates of hostility in a high stress work environment. National Heart, Lung and Blood Institute.

### MEDICAL TECHNOLOGY

Andre MP (Department of Veterans Affairs, Medical Center, San Diego, CA). High resolution digital whole-breast mammography. Department of Veterans Affairs, Research and Development.

Bolt, Beranek and Newman, Inc. (Cambridge, MA). 1994. Increasing the accuracy of mammogram interpretation. \$790,000.

Campbell JL (Department of Veterans Affairs, Medical Center, Kansas City, MO). Detection of biochemical markers of alcohol abuse. Department of Veterans Affairs, Research and Development.

Cole LA (Yale University, New Haven, CT). 1994. Urinary HCGB subunit/core fragment in gynecologic cancer. National Cancer Institute. \$248,150.

Drexel University. 1994. Development of methods for improved breast imaging ultrasound. \$200,000.

Erb JL (Innovation Associates, Inc., Ann Arbor, MI). 1994. Fertile period identification with a TIRF biosensor. National Institute of Child Health and Human Development. \$287,070.

Erb JL (Innovation Associates, Inc., Ann Arbor, MI). 1994. Fiber optic sensor for reproductive hormones. National Institute on Aging. \$78,232.

Evans MI (Wayne State University, Detroit, MI). 1994. Prenatal diagnosis using fetal cells from maternal blood—clinical trial. National Institute of Child Health and Human Development. \$196,066.

Hampar B (Bio-Molecular Technology, Inc., Frederick, MD). 1993. Detection of an active HSV infection during pregnancy. Department of Health and Human Services. \$50,000.

Jackson LG (Thomas Jefferson University, Philadelphia, PA). 1994. Prenatal diagnosis using fetal cells from maternal blood—clinical trial. National Institute of Child Health and Human Development. \$179,249.

Panza JA (National Heart, Lung and Blood Institute, Bethesda, MD). 1994. Dobutamine echocardiography for detection of coronary disease in women. National Heart, Lung and Blood Institute.

Savage HCJ (Apollo Light Systems, Inc., South Orem, UT). 1993. Reproductive medicine phototherapy. Department of Health and Human Services. \$49,825.

Siddiqi TA (University of Cincinnati, Cincinnati, OH). 1994. Ultrasound dosimetry in human OB/GYN examination. National Institute of Child Health and Human Development. \$151,647.

### MENSTRUAL CYCLE

Arafat ES (Rust College, Holly Springs, MS). 1994. Steroid hormones/monoamine neurotransmitters in premenstrual syndrome. National Institute of General Medical Sciences.

Cameron JL (University of Pittsburgh, Pittsburgh, PA). 1992. Etiology of exercise-induced amenorrhea. National Institute of Child Health and Human Development.

Canfield RE (Columbia University, New York, NY). 1994. Hormonal parameters of the normal menstrual cycle. National Center for Research Resources.

Evans WS (University of Virginia, Charlottesville, VA). 1994. Deconvolution of LH, FSH and prolactin in normal cycling women. National Center for Research Resources.

- Fanger MW (Dartmouth College, Hanover, NH). 1994. Characterization of myeloid cells. National Institute of Allergy and Infectious Diseases.
- Ferin M (Columbia University, New York, NY). 1994. The gonadotropin-releasing hormone pulse generator. National Institute of Child Health and Human Development.
- Harlow SD (University of Michigan, Ann Arbor, MI). 1994. An epidemiologic assessment of menstrual cycle patterns. National Institute of Child Health and Human Development. \$102,461.
- Irwin MR (University of California, San Diego, CA). 1994. Immunological effects of menstrual cycle and sleep deprivation. National Center for Research Resources.
- Kripke DF (University of California, San Diego, CA). 1994. Behavioral and light effects on menstrual cycle regulation. National Institute of Mental Health. \$68,526.
- Kripke DF (Department of Veterans Affairs, Medical Center, San Diego, CA). Effects of night lights on irregular menstrual cycle. Department of Veterans Affairs, Research and Development.
- Leslie CA (Department of Veterans Affairs, Medical Center, Bedford, MA). Gender, eicosanoid synthesis and immunity. Department of Veterans Affairs, Research and Development.
- Lewis LL (University of Washington, Seattle, WA). 1994. Nursing appraisal, stress and endocrine dynamics in PMS. National Institute of Nursing Research. \$122,622.
- Lewis LL (University of Washington, Seattle, WA). 1994. Premenstrual syndrome—stress and endocrine dynamics. National Center for Research Resources.
- Liebenluft E (National Institute of Mental Health, Bethesda, MD). 1994. The role of gonadal steroids in regulating circadian rhythms in women. National Institute of Mental Health.
- McClintock MK (University of Chicago, Chicago, IL). 1994. Pheromones, behavior and the regulation of fertility. National Institute of Mental Health. \$270,917.
- Phillips SF (Mayo Foundation, Rochester, MN). 1994. Does gastrointestinal transit of healthy women change during the menstrual cycle. National Center for Research Resources.
- Pogach LM (Department of Veterans Affairs, Medical Center, East Orange, NJ). Characterization of normal and abnormal menstrual cycle and endometrial function. Department of Veterans Affairs, Research and Development.
- Reame NE (University of Michigan, Ann Arbor, MI). 1992. Nursing assessment: menstrual cycle clinical models.
- Rogol AD (University of Virginia, Charlottesville, VA). 1994. Reproductive system function in endurance trained women. National Center for Research Resources.
- Rubinow DR (National Institute of Mental Health, Bethesda, MD). 1994. Psychobiology and treatment of menstrually-related mood disorders. National Institute of Mental Health.
- Schlechte JA (University of Iowa, Iowa City, IA). 1994. Efficacy of estrogen in hyperprolactinemic amenorrhea. National Institute of Diabetes and Digestive and Kidney Diseases. \$200,051.
- Selim AJ (Department of Veterans Affairs, Medical Center, Boston, MA). N.V.A. blood pressure study. Department of Veterans Affairs, Research and Development.
- Shenker Y (Department of Veterans Affairs, Medical Center, Madison, WI). Effects of ANF on AVP secretion during the menstrual cycle. Department of Veterans Affairs, Research and Development.
- Soules MR (University of Washington, Seattle, WA). 1994. Different clinical methods for the diagnosis of luteal phase deficiency. National Center for Research Resources.
- Stouffer RL (Oregon Regional Primate Research Center, Beaverton, OR). 1994. Subpopulations of luteal cells in the ovary. National Institute of Child Health and Human Development. \$196,917.
- Strickland OL (Emory University, Atlanta, GA). 1994. Nursing assessment of PMS—neurometric indices. National Institute of Nursing Research. \$316,237.
- Taylor D (University of California, San Francisco, CA). 1994. Nursing strategies for perimenstrual symptom management. National Institute of Nursing Research. \$99,410.
- Wagner DR (Cornell University Medical Center, New York, NY). 1994. Sleep, temperature and melatonin in LLPDD. National Institute of Mental Health. \$163,990.
- Warren MP (St. Luke's Roosevelt Hospital Center, New York, NY). 1992. Estrogen replacement and complications of amenorrhea. National Institute of Child Health and Human Development.
- Weinshel EH (Department of Veterans Affairs, Medical Center, New York, NY). Effects of the menstrual cycle on the ECG. Department of Veterans Affairs, Research and Development.
- Yen SS (University of California, San Diego, CA). 1994. Biological rhythms of reproductive hormones and neurotransmitters. National Center for Research Resources.
- Yen SS (University of California, San Diego, CA). 1994. Hormonal dynamics during folliculogenesis. National Center for Research Resources.

- Yen SSC (University of California, San Diego, CA). 1994. Estrogen/progesterone fluctuation effect on premenstrual symptoms. National Center for Research Resources.

### MISCELLANEOUS

- Shaver JL (University of Washington, Seattle, WA). 1994. Nursing study of perimenopausal insomnia. National Institute of Nursing Research. \$305,529.
- Smith TW (National Opinion Research Center, Chicago, IL). 1994. Gender differences in self reports on sensitive behaviors. National Science Foundation. \$219,301.
- Steele CM (Stanford University, Stanford, CA). 1994. Protective dis-identification and academic performance. National Institute of Mental Health. \$148,092.
- Tomer KB 1994. Collaborative projects in environmental health sciences. National Institute of Environmental Health Sciences.
- Warren DW (University of Southern California, Los Angeles, CA). 1994. Sex hormone regulation of lacrimal gland secretion. National Eye Institute. \$275,706.
- Wood PA (Department of Veterans Affairs, Medical Center). Mechanisms of the circadian coordination of erythropoiesis. Department of Veterans Affairs, Research and Development.

### MUSCULOSKELETAL, BIOMECHANICS

- Fleming R, Rempel D (National Institute for Occupational Safety and Health, Atlanta, GA). 1994. Intracarpal pressure during hand maneuvers of men and women. Centers for Disease Control and Prevention.
- Morris TL (Department of Veterans Affairs, Medical Center, Hines, IL). Development of a low-dimensional state space representation of lifting dynamics. Department of Veterans Affairs, Research and Development.
- Myklebust B (Department of Veterans Affairs, Medical Center, Milwaukee, WI). Kinesiologic electromyographic studies in normal adult subjects. Department of Veterans Affairs, Research and Development.

### MUSCULOSKELETAL, INJURIES

- Clegg DO (Department of Veterans Affairs, Medical Center, Salt Lake City, UT). Genetic epidemiology of rheumatoid arthritis. Department of Veterans Affairs, Research and Development.
- Davidson A (Yeshiva University, New York, NY). 1994. Using idiotypes to assess SLE in minority women. National Institute of Arthritis and Musculoskeletal and Skin Diseases. \$234,021.
- Everett JG (University of Michigan, Ann Arbor, MI). 1994. Construction tasks for overexertion injuries. National Institute for Occupational Safety and Health. \$37,460.
- Fleming R, Agnew J (National Institute for Occupational Safety and Health, Atlanta, GA). 1994. Age and cumulative trauma disorders in women garment workers. Centers for Disease Control and Prevention.
- Grant K, Sweeney M (National Institute for Occupational Safety and Health, Cincinnati, OH). 1994. Assessment of musculoskeletal disorders in the retail food industry. Centers for Disease Control and Prevention.
- Grisso JA (University of Pennsylvania, Philadelphia, PA). 1992. Causes of hip fractures among black and white women. National Institute of Arthritis and Musculoskeletal and Skin Diseases.
- Roy RR (University of California, Los Angeles, CA). 1994. Response of inactive skeletal muscles to neuromuscular activation. National Institute of Neurological Disorders and Stroke.
- Tanaka S, Behrens V (National Institute for Occupational Safety and Health, Cincinnati, OH). 1994. Analysis of the 1988 National Health Interview Survey (NHIS), Occupational Health Supplement (OHS) Data. Centers for Disease Control and Prevention.

### MUSCULOSKELETAL, TREATMENT

- Gershuni DH (Department of Veterans Affairs, Medical Center, San Diego, CA). Treatment of non-union fractures with the iatromed bone growth stimulator. Department of Veterans Affairs, Research and Development.

## NEUROSENSORY CONDITIONS

- De Simone JA (Virginia Commonwealth University, Richmond, VA). 1994. Voltage clamp probe of taste responses in development. National Institute on Deafness and Other Communication Disorders. \$182,601.
- Doty RL (University of Pennsylvania, Philadelphia, PA). 1994. Neuroendocrine factors and brain mechanisms in olfactory function. National Institute on Deafness and Other Communication Disorders.
- Essick GK (University of North Carolina, Chapel Hill, NC). 1994. Evaluation of perioral directional sensitivity. National Institute of Dental Research.
- Lentz MJ (University of Washington, Seattle, WA). 1994. Measuring sleep changes—accuracy of alternatives to PSG. National Institute of Nursing Research. \$127,495.
- Schneider JE (Lehigh University, Bethlehem, PA). 1995. Metabolic and endocrine control of behavior. National Science Foundation. \$344,515.

## NUTRITION

- Adlercreutz C (University of Helsinki, Helsinki, Finland). 1992. Metabolism of soybean isoflavonoids and lignans in man. National Cancer Institute.
- Amos RJ (Iowa State University, Ames, IA). 1993. Behavioral and health factors that influence the food consumption of young adults. U.S. Department of Agriculture, Cooperative State Research Service.
- Armstrong JE (Washington State University, Pullman, WA). 1993. Culture-specific factors that influence dietary quality in multi-cultural communities. U.S. Department of Agriculture, Cooperative State Research Service.
- Auslander W (Washington University, St. Louis, MO). 1992. Modifying dietary patterns by empowering black women. National Institute of Diabetes and Digestive and Kidney Diseases.
- Bailey L (University of Florida, Gainesville, FL). 1993. Folate utilization and nutrient interaction in human subjects. U.S. Department of Agriculture, Cooperative State Research Service.
- Bailey LB (University of Florida, Gainesville, FL). 1994. Folate kinetics in pregnant human subjects. National Center for Research Resources.
- Baird DD (National Institute of Environmental Health Sciences, Research Triangle Park, NC). 1994. Biological effects of plant estrogens in postmenopausal women. National Institute of Environmental Health Sciences.
- Battaglia FC (University of Colorado Health Sciences Center, Denver, CO). 1994. Evaluation of in vivo placental permeability. National Center for Research Resources.
- Behall K, Canary J (Georgetown University, Washington, DC). 1992. Metabolic effect of incorporation high amylose foods in self-selected diets. U.S. Department of Agriculture, Agricultural Research Service.
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## NUTRITION AND EXERCISE

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- Brooks GA (University of California, Berkeley, CA). 1994. Exercise substrate utilization—the crossover concept. National Institute of Arthritis and Musculoskeletal and Skin Diseases. \$329,469.
- Carlson MG (Vanderbilt University, Nashville, TN). 1994. Regulation of fat metabolism during exercise in humans. National Institute of Diabetes and Digestive and Kidney Diseases. \$109,200.
- Gardner SN (Westat, Inc., Rockville, MD). 1994. Continuation of followup on participants. National Cancer Institute. \$307,910.
- Geliebter A (St. Luke's-Roosevelt Institute for Health Sciences, New York, NY). 1994. Aerobic vs. strength training during dieting in obesity. National Institute of Diabetes and Digestive and Kidney Diseases. \$201,390.
- Goldberg AP (Department of Veterans Affairs, Medical Center, Baltimore, MD). Effects—obesity/physical conditioning/age and sertraline on adipose tissue metabolism/glucose tolerance/insulin/sympathetic nervous system activity & metabolic rate. Department of Veterans Affairs, Research and Development.
- Gowans S (Northwestern University, Chicago, IL). 1994. Effect of diet and exercise on insulin sensitivity after gestational diabetes. National Center for Research Resources.

- Hoffman MD (Department of Veterans Affairs, Medical Center, Milwaukee, WI). Comparison of caloric expenditure among indoor aerobic exercise modes. Department of Veterans Affairs, Research and Development.
- Houtkooper L, Howell W (University of Arizona, Tucson, AZ). Energy balance and body composition of sedentary and highly trained women. U.S. Department of Agriculture, Cooperative State Research Service.
- Klein S (Washington University, St. Louis, MO). 1994. Weight reduction and exercise training in obesity. National Institute of Diabetes and Digestive and Kidney Diseases. \$220,833.
- Williams PT (University of California, Berkeley, CA). 1994. Running and diet effects on lipoprotein subclasses. National Heart, Lung and Blood Institute. \$81,879.
- Williams PT (University of California, Berkeley, CA). 1994. Weight set-point and HDL concentration in runners. National Heart, Lung and Blood Institute. \$355,155.
- Wolfe RR (University of Texas Medical Center, Galveston, TX). 1994. Exercise, lipolysis and fat oxidation. National Institute of Diabetes and Digestive and Kidney Diseases. \$231,415.

### OTOLARYNGOLOGICAL CONDITIONS

- Larson VD (Department of Veterans Affairs, Medical Center, Augusta, GA). The clinical efficacy of simultaneously acquired multi-frequency tympanograms. Department of Veterans Affairs, Research and Development.

### PHARMACEUTICAL

- Anderson KE (University of Texas Medical Center, Galveston, TX). 1994. Efficacy of histrelin in acute porphyria. National Center for Research Resources.
- Badger TM (University of Arkansas, Little Rock, AR). 1994. Alcohol direct and indirect effects on drug metabolism. National Institute on Alcohol Abuse and Alcoholism. \$325,802.
- Bourgoignie JJ (University of Miami, Miami, FL). 1994. African American study of kidney disease. National Institute of Diabetes and Digestive and Kidney Diseases. \$299,254.
- Boyden TW (Department of Veterans Affairs, Medical Center, Tucson, AZ). Efficacy and safety of pravastatin in patients with primary hypercholesterolemia compared to placebo. Department of Veterans Affairs, Research and Development.
- Boyer WF (Department of Veterans Affairs, Medical Center, Decatur, GA). A clinical evaluation of Risperdal in the treatment of schizophrenia. Department of Veterans Affairs, Research and Development.
- Boza RA (Department of Veterans Affairs, Medical Center, Miami, FL). A multi-dose double blind study comparing four doses of Haldol decanote. Department of Veterans Affairs, Research and Development.
- Boza RA (Department of Veterans Affairs, Medical Center, Miami, FL). Seroquel vs. Haldol in prevention of relapse in stable outpatients with schizophrenia. Department of Veterans Affairs, Research and Development.
- Bryg RJ (Department of Veterans Affairs, Medical Center). Comparison of simvastatin and fluvastatin in patients with primary hypercholesterolemia (type IIA and IIB). Department of Veterans Affairs, Research and Development.
- Fenster L (California Public Health Foundation, Berkeley, CA). 1994. Caffeine and human reproduction. National Institute of Child Health and Human Development. \$107,883.
- Keogh JP (University of Maryland, Baltimore, MD). 1994. Phase IV chemoprevention trial beta-carotene/retinol. National Cancer Institute. \$409,376.
- Murphy DL (National Institute of Mental Health, Bethesda, MD). 1994. Neuropharmacology of neuroendocrine and neurotransmitter regulatory mechanisms. National Institute of Mental Health.
- Rosenberg L (Boston University, Boston, MA). 1994. Case-control surveillance of serious illnesses and drugs. National Cancer Institute. \$581,418.
- Thiobonniier M (Case Western Reserve University, Cleveland, OH). 1994. Bioavailability study of levothyroxine (300 mcg) preparations. National Center for Research Resources.

### PHYSICAL FITNESS, GENERAL

- Goldberg AP (Department of Veterans Affairs, Medical Center, Baltimore, MD). Effects of strength training on risk factors for cardiovascular disease and self perceptions in post menopausal women. Department of Veterans Affairs, Research and Development.

- Lowenthal DT (Department of Veterans Affairs, Medical Center, Gainesville, FL). Cross validation of submaximal cycle ergometry estimates of aerobic capacity. Department of Veterans Affairs, Research and Development.
- Maki KC (Department of Veterans Affairs, Medical Center, Hines, IL). Estimating energy expenditure with the AMS-1000 physical activity monitor. Department of Veterans Affairs, Research and Development.
- Pratley RE (Department of Veterans Affairs, Medical Center, Baltimore, MD). Effects of strength training on risks factors for cardiovascular disease and self perceptions in post menopausal women. Department of Veterans Affairs, Research and Development.

## PSYCHOLOGICAL CONDITIONS

- Barr LC (Department of Veterans Affairs, Medical Center, West Haven, CT). Tryptophan depletion and vulnerability to depression. Department of Veterans Affairs, Research and Development.
- Cartwright RD (Rush-Presbyterian-St. Luke's Medical Center, Chicago, IL). 1994. Sex differences in mood disorder and REM sleep/dreaming. National Institute of Mental Health. \$153,688.
- Clarkin JF (Cornell University Medical Center, New York, NY). 1994. Marital treatment for bipolar disorder patients. National Institute of Mental Health. \$277,378.
- Frank E (University of Pittsburgh, Pittsburgh, PA). 1994. Maintenance psychotherapy in recurrent depression. National Institute of Mental Health. \$763,453.
- Genero NP (Wellesley College, Wellesley, MA). 1995. Peer support in high-risk mothers of young children. Maternal and Child Health Bureau.
- Heimberg C (Department of Veterans Affairs, Medical Center, Little Rock, AR). A randomized, comparative study of paroxetine in the treatment of depression as used in a clinical practice setting. Department of Veterans Affairs, Research and Development.
- Howlett BA (Department of Veterans Affairs, Medical Center, Coatesville, PA). An investigation of the relationship between general belief patterns and well-being. Department of Veterans Affairs, Research and Development.
- Kendler KS (Virginia Commonwealth University, Richmond, VA). 1994. Epidemiology of mood, anxiety and alcohol disorders. National Institute of Mental Health. \$1,261,972.
- Leibenluft E (National Institute of Mental Health, Bethesda, MD). 1994. Chronobiological evaluation of rapid-cycling bipolar disorder. National Institute of Mental Health.
- Linehan MM (University of Washington, Seattle, WA). 1994. Assessment and treatment of parasuicide patients. National Institute of Mental Health. \$390,641.
- Major B (State University of New York, Buffalo, NY). 1994. Predicting psychological adjustment to abortion. National Institute of Mental Health. \$259,878.
- Meller W (University of Minnesota Twin Cities, Minneapolis, MN). 1994. Luteinizing hormone secretion in major depression. National Center for Research Resources.
- Mintz J (University of California, Los Angeles, CA). 1994. Work outcome in depression, anxiety, and schizophrenia. National Institute of Mental Health. \$52,085.
- Neal AM (Kent State University, Kent, OH). 1994. Race, reactivity, variability, and panic disorder. National Institute of Mental Health. \$88,668.
- Nolen-Hoeksema SK (Stanford University, Stanford, CA). 1994. Gender differences in depression across the lifespan. National Institute of Mental Health. \$323,794.
- Parry B (University of California, San Diego, CA). 1994. Chronobiology of PMS and seasonal depression. National Center for Research Resources.
- Parry BL (University of California, San Diego, CA). 1994. Chronobiology of postpartum depression. National Center for Research Resources.
- Parry BL (University of California, San Diego, CA). 1994. Melatonin sensitivity to light in women with PMS and mood disorders. National Center for Research Resources.
- Rubinow DR (National Institute of Mental Health, Bethesda, MD). 1994. Hormonal studies of affective disorders. National Institute of Mental Health.
- Rubinow DR (National Institute of Mental Health, Bethesda, MD). 1994. Psychobiology and treatment of menstrually-related mood disorders. National Institute of Mental Health.
- Rubinow DR (National Institute of Mental Health, Bethesda, MD). 1994. Psychobiology and treatment of peri-menopausal mood disorders. National Institute of Mental Health.
- Salomon RM (Department of Veterans Affairs, Medical Center, West Haven, CT). Serotonin mechanisms in sleep deprivation therapy for depression. Department of Veterans Affairs, Research and Development.

- Stahl SM (Department of Veterans Affairs, Medical Center, San Diego, CA). An open label, long term safety study of DN-2327 in the treatment of patients with generalized anxiety disorder. Department of Veterans Affairs, Research and Development.
- Trapp GA (Department of Veterans Affairs, Medical Center, Dallas, TX). Double-blind study to assess the efficacy of maintenance sertraline treatment in the prevention of recurrence in chronic depression. Department of Veterans Affairs, Research and Development.
- Willer JK (Department of Veterans Affairs, Medical Center, Chicago, IL). Mental health needs of female veterans. Department of Veterans Affairs, Research and Development.
- Young EA (University of Michigan, Ann Arbor, MI). 1994. Stress and reproductive hormones in depressed women. National Institute of Mental Health. \$200,215.

## RADIATION

- Graham C (Midwest Research Institute, Kansas City, MO). 1994. EMF effects on melatonin hormones and immunity. National Institute of Environmental Health Sciences. \$280,953.
- London SJ (University of Southern California, Los Angeles, CA). 1994. Magnetic fields and breast cancer risk. National Institute of Environmental Health Sciences. \$176,249.
- Rinehart CA (University of North Carolina, Chapel Hill, NC). 1994. Evaluation of transforming potential of EMF. National Institute of Environmental Health Sciences. \$231,340.
- Ullrich RL (University of Texas, Galveston, TX). 1994. Carcinogenic interactions of radiation and chemicals. National Cancer Institute. \$229,022.
- Wilkinson GS (University of Texas Medical Center, Galveston, TX). 1994. Mortality among female nuclear weapons workers. National Institute for Occupational Safety and Health. \$240,739.

## RESPIRATORY CONDITIONS

- Cassano PA (Cornell University, Ithaca, NY). 1994. Risk factors for chronic obstructive pulmonary disease. National Heart, Lung and Blood Institute. \$95,774.
- Chodosh SMD (Department of Veterans Affairs, Medical Center, Boston, MA). A multicenter investigator-blind efficacy and azithromycin vs. trimethoprim/sulfamethoxazole in the treatment of acute bacterial. Department of Veterans Affairs, Research and Development.
- Chodosh S (Department of Veterans Affairs, Medical Center, Boston, MA). Sparfloxacin vs. ciprofloxacin the treatment of acute bacterial exacerbations of chronic bronchitis. Department of Veterans Affairs, Research and Development.
- Cooper MD (University of Alabama, Birmingham, AL). 1994. Asthma, allergic and immunologic diseases cooperative research center. National Institute of Allergy and Infectious Diseases. \$516,385.
- Desai SG (Department of Veterans Affairs, Medical Center, Allen Park, MI). A multicenter investigator-blinded study of the efficacy and safety of azithromycin vs. amoxicillin/clavulanate. Department of Veterans Affairs, Research and Development.
- Fanta CH (Brigham and Women's Hospital, Boston, MA). 1994. Asthma morbidity among city minorities—educational intervention. National Institute of Allergy and Infectious Diseases.
- Goetzel EJ (University of California, San Francisco, CA). 1994. Neuromediation of immunity and hypersensitivity. National Institute of Allergy and Infectious Diseases. \$495,007.
- Greenberg RN (Department of Veterans Affairs, Medical Center, Lexington, KY). Study of cefdinir in the treatment of secondary bacterial infections of acute bronchitis. Department of Veterans Affairs, Research and Development.
- Gross NJ (Department of Veterans Affairs, Medical Center, Hines, IL). A double-blind, parallel group evaluation of the efficacy and quality of life outcomes of salmeterol versus placebo in asthma patients. Department of Veterans Affairs, Research and Development.
- Hopp LJ (Purdue University, West Lafayette, Indiana). 1994. Incremental threshold loading in healthy subjects. National Institute of Nursing Research. \$109,753.
- Liu JW (Department of Veterans Affairs, Medical Center, Salem, WV). Comparison of the safety and efficacy of oral twice daily administration of SB 205312 with inhaled Tilade in patients with mild to moderate asthma. Department of Veterans Affairs, Research and Development.

- Mikolich DJ (Department of Veterans Affairs, Medical Center, Providence, RI). A comparative study of ciprofloxacin and clarithromycin for the treatment of acute bacterial exacerbation of chronic bronchitis. Department of Veterans Affairs, Research and Development.
- Onal E (Department of Veterans Affairs, Medical Center, Chicago, IL). Upper airway and respiratory muscle control during sleep. Department of Veterans Affairs, Research and Development.
- Ramirez-Ronda CH (Department of Veterans Affairs, Medical Center, San Juan, PR). Double ranging, double-blind, randomized multicenter study of vs. ceftriaxone in the treatment of acute bacterial pneumonia. Department of Veterans Affairs, Research and Development.
- Rubeiz GJ (Department of Veterans Affairs, Medical Center). Phase III, randomized, double-blind, multicenter study of synergid in the treatment of acute community acquired bacterial pneumonia. Department of Veterans Affairs, Research and Development.
- Ruddy S (Virginia Commonwealth University, Richmond, VA). 1994. Cellular mechanisms of allergy and inflammation. National Institute of Allergy and Infectious Diseases. \$421,244.
- Seal E Jr, McDonnell WF, House DE (University of North Carolina, Chapel Hill, NC). 1995. The effects of age, socioeconomic status, and menstrual cycle on the pulmonary response to ozone. U.S. Environmental Protection Agency.
- Valanis BG (Kaiser Foundation Research Institute, Oakland, CA). 1994. Chemoprevention of lung cancer—retinoids/beta-carotene. National Cancer Institute. \$1,211,703.
- Wu-Williams AH (University of Southern California, Los Angeles, CA). 1992. Risk factors of lung cancer in nonsmoking women. National Cancer Institute.

## RESPONSES TO STRESSORS, OTHER

- Adams JH (Morehouse College, Atlanta, GA). 1994. John Henryism, emotion, stressors, and cardiovascular responses. National Institute of Mental Health.
- Altose MD, (Department of Veterans Affairs, Medical Center, Cleveland, OH). Behavioral influences on breathing. Department of Veterans Affairs, Research and Development.
- Armstrong Laboratory (Brooks Air Force Base, San Antonio, TX). 1995. Autonomic functions associated with chronically-repeated training with high G acceleration.
- Benedict JA (Department of Veterans Affairs, Medical Center, Reno, NV). Evaluation of shiftwork on the nutritional status of women. Department of Veterans Affairs, Research and Development.
- Caggiula AR (University of Pittsburgh, Pittsburgh, PA). 1994. Ovarian hormones, stress, and immunologic responsiveness. National Institute of Mental Health. \$249,986.
- Caudell KA (University of Washington, Seattle, WA). 1994. Effect of acute stressor on neuroendocrine and immune function-IBS. National Center for Research Resources.
- Chiappelli F (Department of Veterans Affairs, Medical Center, Los Angeles, CA). Modes of action of beta-endorphin on T cells. Department of Veterans Affairs, Research and Development.
- Clark WC (New York State Psychiatric Institute, New York, NY). 1994. Verbal and physical dimensions of pain and emotion. National Institute of Neurological Disorders and Stroke. \$244,366.
- Czeisler CA (Brigham and Women's Hospital, Boston, MA). 1994. Bright light treatment of shift rotation insomnia. National Heart, Lung and Blood Institute. \$449,813.
- Fenster L (California Public Health Foundation, Berkeley, CA). 1994. Stress and risk for adverse reproductive outcome. National Institute of Mental Health. \$60,900.
- Herbert TB (MPC Corporation, Pittsburgh, PA). 1994. Mechanism linking major depression to immunity. National Institute of Mental Health. \$204,619.
- Krug International 1994. Female acceleration tolerance enhancement (FATE). \$11,786,000.
- Mills PJ (University of California, San Diego, CA). 1994. Contribution of adrenergic receptors to reactivity. National Heart, Lung and Blood Institute. \$113,820.
- Monk TH (University of Pittsburgh, Pittsburgh, PA). 1994. Sleep and circadian dysfunction—emotion and performance. National Institute of Mental Health. \$94,109.
- Morley JE (Department of Veterans Affairs, Medical Center, St. Louis, MO). Effects of physical restraints. Department of Veterans Affairs, Research and Development.
- Niaura RS (Miriam Hospital, Providence, RI). 1994. Coping style stress responsiveness and lipids. National Heart, Lung and Blood Institute. \$271,869.

- Sloan-Kettering Institute for Cancer Research (New York, NY). 1994. A community study of psychological distress and immune function in women with family histories of breast cancer. \$200,000.
- Zautra AJ (Arizona State University, Tempe, AZ). 1994. Interpersonal stress and disease activity in arthritis. National Institute of Arthritis and Musculoskeletal and Skin Diseases. \$114,767.

## RESPONSES TO STRESSORS, PHYSICAL ACTIVITY

- Drinkard BE 1994. Cardiovascular responses to concentric and eccentric isokinetic exercise. Clinical Center.
- Hoffman MD (Department of Veterans Affairs, Medical Center, Milwaukee, WI). Physiological and biomechanical responses during cross country skiing. Department of Veterans Affairs, Research and Development.
- Yen SS (University of California, San Diego, CA). 1994. Hypothalamic amenorrhea—neuroendocrine characterization. National Institute of Child Health and Human Development. \$168,852.

## SEXUAL ASSAULT/HARASSMENT

- Abbey AA (Wayne State University, Detroit, MI). 1994. Alcohol and sexual assault. National Institute of Mental Health.
- Atrash H (National Center for Chronic Disease Prevention and Health Promotion, Atlanta, GA). Prevention of violence against women associated with reproductive health. Centers for Disease Control and Prevention.
- Burt MR (Urban Institute, Washington, DC). 1994. Cognitive representations, coping, and rape recovery. National Institute of Mental Health. \$80,864.
- Dunford FW (University of Colorado, Boulder, CO). 1994. San Diego Navy spouse assault/treatment experiment. National Institute of Mental Health. \$1,500,000.
- Foa EB (Medical College of Pennsylvania, Philadelphia, PA). 1994. Prevention of PTSD following rape and aggravated assault. National Institute of Mental Health. \$295,805.
- Foa EB (Medical College of Pennsylvania, Philadelphia, PA). 1994. Rape victims—persistent reactions and their treatment. National Institute of Mental Health. \$364,796.
- Follingstad DR (University of South Carolina, Columbia, SC). 1994. Prevention of physical violence in dating relationships. National Institute of Mental Health. \$242,277.
- Frazier PA (University of Minnesota Twin Cities, Minneapolis, MN). 1994. Causal attributions and postrape recovery. National Institute of Mental Health. \$88,677.
- Fried LE (Health and Hospitals of the City of Boston, Boston, MA). Violence against pregnant women and pregnancy outcomes. Agency for Health Care Policy and Research. \$21,333.
- Hall SP. (Individual Grant, NC) Intimate relationship abuse perception scale. Agency for Health Care Policy and Research. \$19,992.
- Houston Department of Health and Human Services (Houston, TX); Indiana University of Pennsylvania (Indiana, PA); Johns Hopkins University (Baltimore, MD); Men Stopping Violence, Inc. (Atlanta, GA); Michigan State University (East Lansing, MI); Milwaukee Women's Center, Inc. (Milwaukee, WI); Minnesota Program Development, Inc. (Duluth, MN); Regents of the University of Michigan (Ann Arbor, MI); Rutgers University/The State University of New York (Newark, NJ); University of North Carolina (Chapel Hill, NC); University of North Texas (Denton, TX). 1994. Grants for injury prevention research for violence against women. Centers for Disease Control and Prevention.
- Koss MP (University of Arizona, Tucson, AZ). 1994. Cognitive processing of traumatic sexual victimization. National Institute of Mental Health. \$126,477.
- Nichol KL (Department of Veterans Affairs, Medical Center, Minneapolis, MN). Prevalence of domestic violence among Medicaid eligible women—a pilot study. Department of Veterans Affairs, Research and Development.
- Norris J (University of Washington, Seattle, WA). 1994. Alcohol and social influence. National Institute on Alcohol Abuse and Alcoholism. \$168,158.
- Parrot A (Cornell University, Ithaca, NY). Comparison of acquaintance rape patterns in NYS colleges. U.S. Department of Agriculture, Cooperative State Research Service.
- Resick PA (University of Missouri, St. Louis, MO). 1994. Marital violence in the wake of the great flood of 1993. National Institute of Mental Health. \$71,266.
- Smilkstein G (University of California, Davis, CA). 1994. Spouse abuse and pregnancy outcomes: a prediction study. Maternal and Child Health Bureau.
- Walker EA (University of Washington, Seattle, WA). 1994. Health care utilization in women with sexual abuse. National Institute of Mental Health. \$124,092.

Watson CG (Department of Veterans Affairs, Medical Center, St. Cloud, MN). The incidence of posttraumatic stress disorder (PTSD) in abused women. Department of Veterans Affairs, Research and Development.

## SOCIAL SUPPORT

Kerns RD (Department of Veterans Affairs, Medical Center, West Haven, CT). Gender, coping, and social support in adjustment to chronic pain. Department of Veterans Affairs, Research and Development.

## STDs

- Acholonu AD (Alcorn State University, Lorman, MS). 1994. Trichomonacidal action of some drugs and herbs on *Trichomonas vaginalis* strains. National Institute of General Medical Sciences.
- Apicella MA (University of Iowa, Iowa City, IA). 1994. Lipopolysaccharide of *Neisseria gonorrhoea*. National Institute of Allergy and Infectious Diseases. \$121,185.
- Arno JN (University of Wisconsin, Madison, WI). 1994. Chlamydial antigen presentation by native human cells. National Institute of Allergy and Infectious Diseases.
- Baseman JB (University of Texas, San Antonio, TX). 1994. Sexually Transmitted Diseases Cooperative Research Center. National Institute of Allergy and Infectious Diseases. \$1,562,430.
- Beckmann AM (Fred Hutchinson Cancer Research Center, Seattle, WA). 1994. Pathobiology of anogenital HPV infection. National Cancer Institute. \$148,376.
- Beck-Sague C (National Center for Infectious Diseases, Atlanta, GA). Demonstrations of diagnosis and prevention of chlamydia infections and gonorrhea in non-STD clinic settings that provide primary care to adolescent women. Centers for Disease Control and Prevention.
- Blake MS (Rockefeller University, New York, NY). 1994. Functional aspects of major gonococcal surface proteins. National Institute of Allergy and Infectious Diseases. \$206,653.
- Brown DR (Department of Veterans Affairs, Medical Center, Indianapolis, IN). Effects of progesterone and 17-beta-estradiol on human papillomavirus. Department of Veterans Affairs, Research and Development.
- Burk RD (Yeshiva University, New York, NY). 1994. Natural history of acute HPV infection. National Institute of Allergy and Infectious Diseases. \$524,719.
- Byrne GI (University of Wisconsin, Madison, WI). 1994. Molecular immunology of STDs caused by chlamydia. National Institute of Allergy and Infectious Diseases. \$739,968.
- Byrne GI (Indiana University-Purdue University, Indianapolis, IN). 1994. T cell responses in chlamydial disease. National Institute of Allergy and Infectious Diseases.
- Coker AL (University of South Carolina, Columbia, SC). 1994. CIN risk—interactions of HPV, diet, smoking, and race. National Cancer Institute. \$103,456.
- Compans RW (Emory University, Atlanta, GA). 1994. Mucosal and systemic immunity to HTLV and STLV. National Cancer Institute. \$145,260.
- Corbeil LB (University of California, San Diego, CA). 1994. Enhancing mucosal immunity to trichomoniasis. National Institute of Allergy and Infectious Diseases. \$213,073.
- Deal CD (Johns Hopkins University, Baltimore, MD). 1994. Immune responses to gonococcal infections. National Institute of Allergy and Infectious Diseases.
- Ehrhardt AA (New York State Psychiatric Institute, New York, NY). 1994. Sexual risk behavior and behavior change in heterosexual women and men. National Institute of Mental Health.
- Fife KH (Indiana University-Purdue University, Indianapolis, IN). 1994. Papillomavirus infections in pregnancy. National Institute of Allergy and Infectious Diseases.
- Glass AG (Center for Health Research, Portland, OR). 1992. Prospective investigation of human papillomavirus. National Cancer Institute.
- Griffiss JM (Department of Veterans Affairs, Medical Center, San Francisco, CA). Bay Area STD program. Department of Veterans Affairs, Research and Development.
- Griffiss JML (Department of Veterans Affairs, Medical Center, San Francisco, CA). VA/DOD collaboration: genetic regulation of gonococcal LOS synthesis. Department of Veterans Affairs, Research and Development.
- Harlow LL (University of Rhode Island, Kingston, RI). 1994. Predicting HIV-risky heterosexual behavior in women. National Institute of Mental Health. \$215,603.



- Hillier SL (University of Washington, Seattle, WA). 1994. Hydrogen peroxide-producing *Lactobacilli* and STD resistance in women. National Institute of Allergy and Infectious Diseases.
- Holmes KK (University of Washington, Seattle, WA). 1994. University of Washington STD Cooperative Research Center. National Institute of Allergy and Infectious Diseases. \$1,290,887.
- Jones RB (Indiana University-Purdue University, Indianapolis, IN). 1994. Midwest Sexually Transmitted Diseases Research Center. National Institute of Allergy and Infectious Diseases. \$1,278,973.
- Koch WC (Virginia Commonwealth University, Richmond, VA). 1994. Maternal antibody responses to parvovirus B19. National Institute of Allergy and Infectious Diseases. \$91,800.
- Lawrence PJ (Litmus Concepts, Inc., Santa Clara, CA). 1994. Screening test for *Chlamydia trachomatis* in women. National Institute of Allergy and Infectious Diseases. \$239,631.
- Litmus Concepts, Inc. (Santa Clara, CA). 1991. A screening test for *Chlamydia trachomatis* in women. Department of Health and Human Services. \$50,000.
- Macaluso M (University of Alabama, Birmingham, AL). 1994. Barrier contraception for prevention of STD. National Institute of Child Health and Human Development. \$1,271,230.
- Mastecky J (University of Alabama, Birmingham, AL). 1994. Mucosal immunization strategies for genital immunity. National Institute of Allergy and Infectious Diseases.
- Masterson BJ (Department of Veterans Affairs, Medical Center, Livermore, CA). Cellular immunity in women with genital human papilloma viral infection. Department of Veterans Affairs, Research and Development.
- McQuillen DP (Boston Health and Hospitals, Boston, MA). 1994. Immune interactions of gonorrhea and vaccine development. National Institute of Allergy and Infectious Diseases. \$92,988.
- Miles J (National Center for Prevention Services, Atlanta, GA). Prevention of infertility caused by sexually transmitted diseases. Centers for Disease Control and Prevention.
- Miles J (National Center for Prevention Services, Atlanta, GA). Sexually Transmitted Diseases Accelerated Prevention Campaigns (STD APC). Centers for Disease Control and Prevention.
- Miles J, Walsh CM (National Center for Prevention Services, Atlanta, GA). 1994. Infertility Prevention Initiative: regional service provision projects. Centers for Disease Control and Prevention.
- Morrison RP (National Institute of Allergy and Infectious Diseases). 1994. Immunopathogenesis of chlamydial infections. National Institute of Allergy and Infectious Diseases.
- Novak M (Secretech, Inc., Birmingham, AL). 1993. Mucosal vaccine for sexually transmitted chlamydia. Department of Health and Human Services. \$50,000.
- O'Hagan DT (United Biomedical, Inc., Hauppauge, NY). 1994. Oral/intravaginal delivery for chlamydia vaccine. National Institute of Allergy and Infectious Diseases. \$72,986.
- Padian NS (University of California, San Francisco, CA). 1994. Sexual partners and risk of pelvic inflammatory disease. National Institute of Allergy and Infectious Diseases.
- Parr MB (Southern Illinois University, Carbondale, IL). 1994. Mucosal immunity in the female genital tract. National Institute of Child Health and Human Development. \$132,253.
- Petrie CR (Microprobe Corporation, Bothell, WA). 1992. Simultaneous detection of *N. gonorrhoea* and *C. trachomatis*. Department of Health and Human Services. \$50,000.
- Rank RG (University of Arkansas, Little Rock, AR). 1994. T-cell mediated immunity in chlamydial genital infection. National Institute of Allergy and Infectious Diseases. \$226,583.
- Rest RF (Hahnemann University, Philadelphia, PA). 1994. Anaerobiosis, CMP-NANA and gonococcal pathogenesis. National Institute of Allergy and Infectious Diseases. \$253,050.
- Rice PA (Boston City Hospital, Boston, MA). 1994. Clinical and laboratory studies of PID. National Institute of Allergy and Infectious Diseases. \$816,284.
- Rice PA (Boston City Hospital, Boston, MA). 1994. Resolutions of sexually acquired endometritis. National Institute of Allergy and Infectious Diseases.
- Russell MW (University of Alabama, Birmingham, AL). 1994. Mucosal immunity in gonococcal infection. National Institute of Allergy and Infectious Diseases. \$200,824.
- Schachter J (University of California, San Francisco, CA). 1994. Chlamydia and douching in ectopic pregnancy. National Institute of Allergy and Infectious Diseases. \$266,238.
- Schachter J (University of California, San Francisco, CA). 1994. San Francisco STD Cooperative Research Center. National Institute of Allergy and Infectious Diseases. \$1,521,221.
- Seifert HS (Indiana University-Purdue University, Indianapolis, IN). 1994. Gonococcal pilin serology and gene usage in vivo. National Institute of Allergy and Infectious Diseases.
- Shafer MAB (University of California, San Francisco, CA). 1994. Military-based intervention to prevent urethritis/STDs. National Institute of Allergy and Infectious Diseases.

- Shain RN (University of Texas Health Science Center, San Antonio, TX). 1994. Modifying STD risk behavior among Mexican American women. National Institute of Allergy and Infectious Diseases.
- Soll DR (University of Iowa, Iowa City, IA). 1994. Vaginitropic and vaginopathic strains of *Candida albicans*. National Institute of Allergy and Infectious Diseases. \$192,150.
- Sparling PF (University of North Carolina, Chapel Hill, NC). 1994. Genetics and biology of gonococcal Protein I. National Institute of Allergy and Infectious Diseases. \$242,871.
- St. Louis ME (National Center for Prevention Services, Atlanta, GA). 1994. Infertility Prevention Initiative: program development and evaluation projects. Centers for Disease Control and Prevention.
- Stamm WE (University of Washington, Seattle, WA). 1994. Chlamydia and pelvic inflammatory disease. National Institute of Allergy and Infectious Diseases. \$965,973.
- Sweet RL (University of California, San Francisco, CA). 1994. Inapparent PID in female contacts of men with urethritis. National Institute of Allergy and Infectious Diseases.
- Testa ML (New York State Council for Mental Hygiene Planning, Albany, NY). 1994. Alcohol and sexual risk taking among women. National Institute on Alcohol Abuse and Alcoholism. \$99,694.
- Tyring SK (University of Texas, Galveston, TX). 1994. Oral famciclovir in the suppression of recurrent genital herpes infection. National Center for Research Resources.
- Wheeler CM (University of New Mexico, Albuquerque, NM). 1994. PCR based natural history study of HPV infections. National Institute of Allergy and Infectious Diseases. \$77,199.
- Wyrick PB (University of North Carolina, Chapel Hill, NC). 1994. Virulence factors of chlamydiae. National Institute of Allergy and Infectious Diseases. \$289,348.

## SUBSTANCE ABUSE

- Ahijevych K (Ohio State University, Columbus, OH). 1994. Cigarette smoking topography among African American and Caucasian women. National Center for Research Resources.
- Ammenheuser MM (University of Texas Medical Center, Galveston, TX). 1994. Mutant T-cells in pregnant abusers of drugs and tobacco. National Institute on Drug Abuse. \$73,428.
- Anthony JC (National Institute on Drug Abuse, Bethesda, MD). 1994. Analysis of data from the National Comorbidity Survey. National Institute on Drug Abuse.
- Association of Maternal and Child Health (Washington, D.C.). 1994. Maternal and child health programs for prenatal smoking cessation. Centers for Disease Control and Prevention.
- Badger TM (University of Arkansas, Little Rock, AR). 1994. Alcohol direct and indirect effects on drug metabolism. National Institute on Alcohol Abuse and Alcoholism. \$325,802.
- Chang G (Brigham and Women's Hospital, Boston, MA). 1994. Alcohol abuse in pregnancy. National Institute on Alcohol Abuse and Alcoholism. \$289,614.
- Connors GJ (Research Institute on Addictions, Buffalo, NY). 1994. Enhancing involvement in outpatient alcoholism treatment. National Institute on Alcohol Abuse and Alcoholism. \$224,876.
- Cottler LM (Washington University, St. Louis, MO). 1994. Reliability of DSM and ICD substance use disorders. National Institute on Drug Abuse. \$324,383.
- Cutter HSG (Department of Veterans Affairs, Medical Center, Brockton, MA). Multisite study of substance use diagnosis. Department of Veterans Affairs, Research and Development.
- De Vaud LL (University of North Carolina, Chapel Hill, NC). 1994. Gender specific effects of ethanol on GABA A receptors. National Institute on Alcohol Abuse and Alcoholism. \$88,700.
- Engle M (University of Alabama, Birmingham, AL). 1994. Substance abuse awareness intervention. National Institute on Drug Abuse. \$384,858.
- Fisher SE (North Shore University Hospital, Manhasset, NY). 1994. Ethanol and fetal growth—role of the placenta. National Institute on Alcohol Abuse and Alcoholism. \$405,862.
- Fortmann SP (Stanford University, Stanford, CA). 1994. Nicotine patch treatment for smoking relapse prevention. National Heart, Lung and Blood Institute. \$366,822.
- French MT (Research Triangle Institute, Research Triangle Park, NC). 1994. Workplace alcohol programs for women and minorities. National Institute on Alcohol Abuse and Alcoholism. \$381,301.
- Gianoulakis C (Douglas Hospital Centre, Quebec, Canada). 1994. Prenatal ethanol effects on the B endorphin systems. National Institute on Alcohol Abuse and Alcoholism. \$52,636.
- Gilbert DG (Southern Illinois University, Carbondale, IL). 1994. Gender and vulnerability factors in cigarette abstinence. National Institute on Drug Abuse. \$252,264.

- Goldberg AP (Department of Veterans Affairs, Medical Center, Baltimore, MD). Metabolic effects of cigarette smoking, the nicotine patch, and smoking cessation. Department of Veterans Affairs, Research and Development.
- Goldstein PJ (University of Illinois, Chicago, IL). 1994. Anabolic steroids—new issue in prevention research. National Institute on Drug Abuse. \$606,668.
- Greenfield TK (California Pacific Medical Center, San Francisco, CA). 1994. Impact of alcoholic beverage warning labels. National Institute on Alcohol Abuse and Alcoholism. \$307,895.
- Hankin JR (Wayne State University, Detroit, MI). 1994. Impact of labeling and education on antenatal drinking. National Institute on Alcohol Abuse and Alcoholism. \$179,171.
- Hasin DS (New York State Psychiatric Institute, New York, NY). 1994. Validating epidemiologic measures of alcohol dependence. National Institute on Alcohol Abuse and Alcoholism. \$210,244.
- Hughes TK (University of Texas, Galveston, TX). 1994. Anabolic steroids and the immune-neuroendocrine axis. National Institute on Drug Abuse. \$128,202.
- Hutchins EM (Baltimore, MD). Risk factors for prenatal drug use and treatment success. Agency for Health Care Policy and Research. \$5,005.
- Jamner LD (Department of Veterans Affairs, Medical Center, Fresno, CA). Stress, nicotine, and blood pressure: influences of gender and oral contraceptives. Department of Veterans Affairs, Research and Development.
- Kabat GC (American Health Foundation, Valhalla, NY). 1994. General epidemiology of tobacco-related cancers. National Cancer Institute.
- Klesges RC (University of Memphis, Memphis, TN). 1994. Sex, smoking rate, and postcessation weight gain. National Heart, Lung and Blood Institute. \$313,868.
- Krahn DD (University of Michigan, Ann Arbor, MI). 1992. Effect of dieting on alcohol and drug use in young women. National Institute on Drug Abuse.
- Maisto SA (University of Pittsburgh, Pittsburgh, PA). 1994. Brief intervention and stage of change in primary care. National Institute on Alcohol Abuse and Alcoholism. \$344,162.
- Marcus BH (Miriam Hospital, Providence, RI). 1994. Smoking cessation, weight gain, and exercise in women. National Cancer Institute. \$189,442.
- McLeod DR (Johns Hopkins University, Baltimore, MD). 1994. Family history of alcoholism and premenstrual symptoms. National Institute on Alcohol Abuse and Alcoholism. \$201,548.
- Pomerleau OF (University of Michigan, Ann Arbor, MI). 1994. Smoking and the effects of nicotine in women. National Cancer Institute. \$38,000.
- Rost KM (University of Arkansas, Little Rock, AR). 1994. Service use and course of drinking in rural drinkers. National Institute on Alcohol Abuse and Alcoholism. \$407,382.
- Secker-Walker RH (University of Vermont, Burlington, VT). 1994. Community coalitions to help women quit smoking. National Heart, Lung and Blood Institute. \$372,137.
- Snow DL (Yale University, New Haven, CT). 1994. Impact of a worksite intervention on alcohol use. National Institute on Alcohol Abuse and Alcoholism. \$171,000.
- Spagnolo SV (Veterans Administration Medical Center, Washington, DC). 1992. Smoking, diet, and other risk factors for tobacco-related cancers. Veterans Administration.
- Sullivan SE (Park Nicollet Medical Foundation, Saint Louis Park, MN). 1994. Reducing smoking-related risk for cervical cancer. National Cancer Institute. \$28,675.
- Tarter RE (University of Pittsburgh, Pittsburgh, PA). 1994. Drug abuse vulnerability—mechanisms and manifestations. National Institute on Drug Abuse. \$1,597,571.
- Taylor AN (Department of Veterans Affairs, Medical Center, Los Angeles, CA). Alcohol regulation of neuroendocrine-immune interactions in vivo. Department of Veterans Affairs, Research and Development.
- Testa ML (New York State Council for Mental Hygiene Planning, Albany, NY). 1994. Alcohol and sexual risk taking among women. National Institute on Alcohol Abuse and Alcoholism. \$99,694.
- Volk RJ (University of Texas, Galveston, TX). 1994. Primary care alcohol screens—patient sex and ethnicity. National Institute on Alcohol Abuse and Alcoholism. \$74,750.

## TOXINS

- Abbey DE (Loma Linda University, Loma Linda, CA). 1994. Cancer incidence associated with ambient air pollution. National Institute of Environmental Health Sciences. \$118,488.
- Anderson L (National Cancer Institute, Bethesda, MD). 1994. Transplacental carcinogenesis and tumor promotion in nonhuman primates. National Cancer Institute.

- Armstrong Laboratory (Brooks Air Force Base, TX) 1994. DERA health standards—quantitative health and risk analysis.
- Baden JM (Department of Veterans Affairs, Medical Center). Adrenergic mechanisms of nitrous oxide-induced teratogenicity. Department of Veterans Affairs, Research and Development.
- Bhattacharyya MH (Argonne National Laboratory, Argonne, IL). Biochemical mechanisms of chemically induced health effects. U.S. Department of Energy.
- Blair AE (National Cancer Institute, Bethesda, MD). 1994. Studies of occupational cancer. National Cancer Institute.
- California Public Health Foundation. 1994. Measurements of dioxin, PCB and organochlorine levels in breast adipose tissue from women with and without breast cancer. \$149,000.
- Concato JP (Department of Veterans Affairs, Medical Center, West Haven, CT). Respiratory effects of ambient air pollution among veterans of the Persian Gulf conflict. Department of Veterans Affairs, Research and Development.
- Cramer DW (Brigham and Women's Hospital, Boston, MA). 1994. Ovarian cancer risk and hypergonadotropic hypogonadism. National Cancer Institute. \$588,607.
- Cullen MR (Yale University, New Haven, CT). 1994. Beta-carotene/retinol chemoprevention trial in asbestos exposed group. National Cancer Institute. \$357,682.
- Davis BJ (North Carolina State University, Raleigh, NC). 1994. Pathogenesis of ovarian toxicants. National Institute of Environmental Health Sciences. \$67,333.
- Goldberg SJ (University of Arizona, Tucson, AZ). 1994. Cardiac teratogenicity of trichloroethylene. National Institute of Environmental Health Sciences.
- Gunnison AF (New York University, New York, NY). 1994. O<sub>3</sub> sensitive subpopulations—identification and mechanism. National Institute of Environmental Health Sciences. \$235,449.
- James DS (Department of Veterans Affairs, Medical Center, Albuquerque, NM). Ventilation and activity patterns in workers exposed to inhaled pollutants. Department of Veterans Affairs, Research and Development.
- Juchau MR (University of Washington, Seattle, WA). 1994. Embryotoxicity of environmental chemicals. National Institute of Environmental Health Sciences. \$295,248.
- Klein NW (University of Connecticut, Storrs, CT). 1994. Pollutants, laminin antibody and reproductive failure. National Institute of Environmental Health Sciences. \$145,500.
- Kupfer D (Worcester Foundation for Experimental Biology, Shrewsbury, MA). 1994. Chlorinated hydrocarbons effects. National Institute of Environmental Health Sciences. \$435,467.
- Longstreth W Jr (University of Washington, Seattle, WA). 1994. Risk factors for amyotrophic lateral sclerosis. National Institute of Neurological Disorders and Stroke. \$193,859.
- Lynch C (University of Iowa, Iowa City, IA). 1994. Cancer among men and women in agriculture. National Cancer Institute. \$616,011.
- Markowitz ME (Montefiore Medical Center, Bronx, NY). 1995. Impact of maternal lead stores on fetal lead exposure. Maternal and Child Health Bureau.
- McDonnell C (SRA Technologies, Inc., Falls Church, VA). 1994. Prospective cohort study of cancer. National Cancer Institute. \$760,653.
- Meholic AJ (Department of Veterans Affairs, Medical Center, Albuquerque, NM). Morphometric measurement of adult human nasal airways using MRI. Department of Veterans Affairs, Research and Development.
- Monson RR (Harvard University, Boston, MA). 1994. Superfund toxic substances—exposure and disease. National Institute of Environmental Health Sciences. \$1,898,411.
- National Institute for Occupational Safety and Health 1994. Breast cancer incidence in occupational cohorts exposed to ethylene oxide and polychlorinated biphenyls. \$838,000.
- Sandler DP (National Institute of Environmental Health Sciences, Research Triangle Park, NC). 1994. Environmental exposures and chronic renal and other diseases. National Institute of Environmental Health Sciences.
- Schur PH (Brigham and Women's Hospital, Boston, MA). 1994. Effects of silicone on the immune response. National Institute of Arthritis and Musculoskeletal and Skin Diseases. \$296,645.
- Seegal RF (State University of New York, Albany, NY). 1994. Developmental neurotoxicology of perinatal exposure to halogenated aromatics. National Institute of Environmental Health Sciences.
- Ullman JS (Pennsylvania State University, University Park, PA). 1994. Distribution of ozone in intact lungs. National Institute of Environmental Health Sciences. \$164,940.
- Vandevort C (University of California, Davis, CA). 1994. Mechanisms and biomarkers of female reproductive toxicity. National Institute of Environmental Health Sciences.
- Wolf G (Row Sciences, Inc., Rockville, MD). 1994. Reproductive toxicity test system. National Institute of Environmental Health Sciences. \$1,200,000.

**TRAUMATIC STRESS, COMBAT**

- Brown TM (Department of Veterans Affairs, Medical Center, Augusta, GA). Polysomnographic and psychometric analysis of a group of patients complaining of the Gulf War fatigue syndrome. Department of Veterans Affairs, Research and Development.
- Dohrenwend BP (Columbia University, New York, NY). 1994. Israeli reactions to SCUD attacks during the Gulf War. National Institute of Mental Health. \$161,913.
- Kubany ES (Department of Veterans Affairs, Medical Center, Honolulu, HI). Trauma-related guilt: scale development and validation. Department of Veterans Affairs, Research and Development.
- Morgan CA III (Department of Veterans Affairs, Medical Center, West Haven, CT). Acoustic startle response in war veterans. Department of Veterans Affairs, Research and Development.
- Morgan CA III (Department of Veterans Affairs, Medical Center, West Haven, CT). Effects of diazepam and buspirone anxiolytics on baseline and fear potentiated startle in war veterans. Department of Veterans Affairs, Research and Development.
- Murburg MM (Department of Veterans Affairs, Medical Center, Palo Alto, CA). Sympathetic nervous system function in female and male veterans with post-traumatic stress disorder. Department of Veterans Affairs, Research and Development.
- Murphy RT (Department of Veterans Affairs, Medical Center, Palo Alto, CA). Combat exposure, early trauma, and alcohol problems. Department of Veterans Affairs, Research and Development.
- Sutker PB (Department of Veterans Affairs, Medical Center, New Orleans, LA). Evaluation of cognitive functioning in Persian War Gulf veterans reporting war-related health problems. Department of Veterans Affairs, Research and Development.
- Sutker PB (Department of Veterans Affairs, Medical Center, New Orleans, LA). Psychological assessment of Operation Desert Storm (ODS) returnees. Department of Veterans Affairs, Research and Development.
- West JA (Department of Veterans Affairs, Medical Center, New Orleans, LA). Relationship between sensory and perceptual process to patterns of psychopathology and PTSD in Vietnam and ODS theater veterans. Department of Veterans Affairs, Research and Development.

**TRAUMATIC STRESS, OTHER**

- Baker DG (Department of Veterans Affairs, Medical Center, Cincinnati, OH). Multicenter/parallel-group, double-blind/placebo controlled trial of brofaromine hydrochloride in patients with post-traumatic stress disorder. Department of Veterans Affairs, Research and Development.
- Burt MR (Urban Institute, Washington, DC). 1994. Cognitive representations, coping, and rape recovery. National Institute of Mental Health. \$80,864.
- Chen C (Department of Veterans Affairs, Medical Center, East Orange, NJ). Seasonal variation of PTSD. Department of Veterans Affairs, Research and Development.
- Davidson JR (Duke University, Durham, NC). 1994. Fluoxetine treatment of posttraumatic stress disorder. National Institute of Mental Health. \$346,933.
- Davidson JRT (Department of Veterans Affairs, Medical Center, Durham, NC). Double-blind comparison of sertraline and placebo in outpatients with post-traumatic stress disorder. Department of Veterans Affairs, Research and Development.
- Erbebo NE (Department of Veterans Affairs, Medical Center, Fort Harrison, MT). Empirical validation of a model of traumatic guilt. Department of Veterans Affairs, Research and Development.
- Foa EB (Medical College of Pennsylvania, Philadelphia, PA). 1994. Prevention of PTSD following rape and aggravated assault. National Institute of Mental Health. \$295,805.
- Foa EB (Medical College of Pennsylvania, Philadelphia, PA). 1994. Rape victims—persistent reactions and their treatment. National Institute of Mental Health. \$364,796.
- Hall SP (North Carolina). Intimate relationship abuse perception scale. Agency for Health Care Policy and Research. \$19,992.
- Hertzberg M (Department of Veterans Affairs, Medical Center, Durham, NC). Double-blind comparison of sertraline and placebo in outpatients with post-traumatic stress disorder. Department of Veterans Affairs, Research and Development.
- Hertzberg M (Department of Veterans Affairs, Medical Center, Durham, NC). Preliminary study of fluvoxamine treatment of post-traumatic stress disorder. Department of Veterans Affairs, Research and Development.
- Holbrook TL (University of California, San Diego, CA). 1994. Prospective study of functional limitation after trauma. Agency for Health Care Policy and Research. \$420,610.

- Holman W (Department of Veterans Affairs, Medical Center, Birmingham, AL). The immune-adrenal axis in humans. Department of Veterans Affairs, Research and Development.
- Keller TW (Department of Veterans Affairs, Medical Center, Seattle, WA). A placebo-controlled, double blind, parallel trial of brofaromine hydrochloride in patients with PTSD. Department of Veterans Affairs, Research and Development.
- Koss MP (University of Arizona, Tucson, AZ). 1994. Cognitive processing of traumatic sexual victimization. National Institute of Mental Health. \$126,477.
- Kudler HS (Department of Veterans Affairs, Medical Center, Durham, NC). Fluoxetine treatment of posttraumatic stress disorder. Department of Veterans Affairs, Research and Development.
- Marmar CR (Department of Veterans Affairs, Medical Center, San Francisco, CA). Rescue worker responses to the I-880 freeway collapse. Department of Veterans Affairs, Research and Development.
- Morgan CA III (Department of Veterans Affairs, Medical Center, West Haven, CT). Fear acquisition and fear extinction in post traumatic stress disorder. Department of Veterans Affairs, Research and Development.
- Najavits LM (McLean Hospital, Belmont, MA). 1994. Group cognitive behavior therapy and dual diagnosis—women. National Institute on Drug Abuse. \$81,261.
- Resick PA (University of Missouri, St. Louis, MO). 1994. Cognitive processes in PTSD: treatment. National Institute of Mental Health. \$305,994.
- Sutker PB (Department of Veterans Affairs, Medical Center, New Orleans, LA). Psychological outcomes to hurricanes: a risk factor model. Department of Veterans Affairs, Research and Development.
- Watson CG (Department of Veterans Affairs, Medical Center, St. Cloud, MN). The incidence of posttraumatic stress disorder (PTSD) in abused women. Department of Veterans Affairs, Research and Development.

## Part B

### FY 1994 Defense Women's Health Research Program Intramural Projects

The following intramural projects were funded by the Defense Woman's Health Research Program, FY 1994. Some projects have been placed in more than one category.

#### BONE

- Craft DW (Dwight David Eisenhower Army Medical Center, Ft. Gordon, GA). 1994. The Effect of Levonorgestrel (Norplant) on the Immune Regulation of Bone Morphogenesis.
- Duncan WE (Walter Reed Army Medical Center, Washington, DC). 1994. Osteoporosis in Servicewomen: Causes, Therapy, Outcomes, and Relationships to Fractures.
- Hanson BS (Dwight David Eisenhower Army Medical Center, Ft. Gordon, GA). 1994. The Effects of Estrogen and Progesterone Levels on Osseointegration of Dental Implants.
- Jones C (Madigan Army Medical Center, Tacoma, WA). 1994. Use of Pulsing Electromagnetic Fields for the Treatment of Pelvic Stress Fractures among Female Soldiers.
- McDermott MT (Fitzsimmons Army Medical Center, Aurora, CO). 1994. The Effects of Region-Specific Resistance Exercises on Bone Mass in Premenopausal Military Women.
- Shaffer RA (Naval Health Research Center, San Diego, CA). 1994. Use of Noninvasive Bone Structural Measurements to Evaluate Stress Fracture Susceptibility among Female Recruits in U.S. Marine Corps Basic Training.
- Snedecor MR (Office for Prevention and Health Services Assessment, Brooks Air Force Base, TX). 1994. Injury and Morbidity Rates Among Air Force Female Basic Military Recruits.
- Strider JW Jr. (Dwight David Eisenhower Army Medical Center, Fort Gordon, GA). 1994. Women's Health Care Issues: The Incidence of Localized Osteitis in Female Soldiers Using Norplant Contraceptive.

#### CARDIOVASCULAR HEALTH

- Calagan JL (Fitzsimmons Army Medical Center, Aurora, CO). 1994. Chest Pain Syndrome in Active Duty Females: Screening and Diagnosis.
- McBiles M (Fitzsimmons Army Medical Center, Aurora, CO). 1994. Simultaneous Transmission/Emission Protocol (STEP) for Attenuation Correction of Breast and Diaphragmatic Attenuation Artifacts during SPECT 99mTc-Sestamibi Myocardial Perfusion.

#### COMMUNICABLE DISEASES

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